Contractual Choice and Sustainable Relationship between Landlords and Tenants in Khyber Pakhtunkhwa, Pakistan

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Abstract

Arrangement of the study. The dissertation is consolidated of main studies, the first one is associated on the baseline survey in year (2014), the second is delineated on Analytical Hierarchy process in year (2015) and the third is based on linear programming in year (2016) in Khyber Pakhtunkhwa Pakistan.

The distinctiveness of Study 1. This study examines the present land tenancy arrangements and their long-term duration, which were manage informally in the landlord, tenant relationship. Also examines the relationship between each landlord and tenant in these tenancy contracts with their contractual parameters, then discuss the sole differences of the sample respondents in each contract, in comparison with famous research works in the field of land tenancy. The information was collected through baseline survey in year 2014 from February 1st to March 16th. This information was based on three major growing crops Wheat, Sugarcane and Tobacco, which were grown in the cropping year 2013, from the selected three villages of district Swabi Khyber Pakhtunkhwa Pakistan. Mixed method was applied to explore the quantitative as well as qualitative significance of the selected 30 respondents in this research work, also discussed features, Age in (year), Education in (year), family labors (men) and cultivated land size in (acre), as well as decision making behavior of the sampled respondents in these informal tenancy contracts. The finding of our study are long-term duration in tenancy contracts, which were recorded as, twenty-one year's maximum and minimum of four years and their four different contract types, which were Share, Fixed, Owner cultivation and Multiple contract. All these finding shows the differences of this research work from the others researches empirical works in shape of long-term duration and multiple contract between one tenant and different landlords. This study recommends that the government should take some initiative towards land reforms and make these land tenancy contracts in written form in the study area and in country as a whole, so that it would be better for both the landlords and tenants to know about their contract contractual formation clearly, especially for the landless laborers in the rural Pakistan, which will give secure tenure status and more decision power, then the tenants will work hard and invest more in the land, through which we will see improvement in agriculture production in the country as well as for the whole region, which will also play a key role in future food security.

The distinctiveness of Study 2. New approaches and tools are needed to enable land tenancy arrangements in the developing countries to specify the landlord-tenant relationship in general and particularly in the targeted study area Khyber Pakhtunkhwa Pakistan. So, this research work applying a multi-criteria decision-making approach (MCDM) to investigate the important factors which greatly impact on initial signing process of land tenancy contracts between landlords and tenants by using Analytical Hierarchy Process (AHP) as a tool, this qualitative decision making technique has not been used extensively in the country especially in the landlord tenant relations. For the purpose, we conducted survey in August 2015 and

interviewed 10 respondents (6 landlords and 4 tenants) in a hypothetical situation from the baseline survey through a well-developed questionnaire by using excel based "Tones" method in AHP. However, AHP is a methodology that facilitate respondents to trade off nonmarket factors of land tenancy contracts. Thus, the information was collected for the important factors (criterion) which has great effect in the initial contract agreement in the landlord-tenant relationship in our research area within each tenancy contract (alternative) then the important factors were incorporated in the AHP framework and subjected to the landlord-tenant judgments for each tenancy contract. The finalized, factors were, character, financial position, men power, experience, reference, land condition and house availability. The results of the AHP application to data collected from six different villages found that landlords' preferences are strongest for character, men power in share cropping, distance, financial position in fixed contract, experience and men power in owner cultivation and the tenant's partialities are strongest for house availability, financial position in share contract, land condition, reference in lease contract and in owner cultivation nothing found important. In overall we found that the dominant choice in the tenancy contract for landlords are share contract 45.7%, followed by rent contract 30.9% and less important owner cultivation 22.3% and in case of tenants we found that the most preferable land tenancy contract is sharecropping 51.7% and fixed contract 41.7%, less effective 6.25% owner cultivation in the selected study villages. This study recommends that the agriculture and extension services departments of Khyber Pakhtunkhwa province to apply AHP as tool in the wide range of multi sector in agriculture decisions, such as to determine best allocation for farm production, adaptation of latest technological tools and choices among different food and cash crop.

The distinctiveness of Study 3. Being a developing country, the role of its agriculture sector in the economic structure cannot be ignored. This study applied linear programming farm planning model simulation to examine the economic effect of four major crops grower. For the purpose, two models were developed base on their land tenancy types, which are share model, fixe-rent model. The farm household survey data (2014-2016) of 30 farmers was implied for the model coefficients. The labor operation hours and profit coefficients were totaled for fixed-rent and share contract farmers based on per acre area. Also for LP models' computation and optimal solutions the "XLP" method was adopted. The outcome of estimated models was recoded as optimal profit, land acreages and shadow price. The optimal solution of share model estimates was 228,032.9, fixed-rent 202,795 respectively. Therefore, the land tenancy models estimate suggested for sustainable agriculture development in the region that does not yet exit. This study recommends that the agriculture and extension services departments of Khyber Pakhtunkhwa province to apply XLP as a tool in the wide range of farm planning decision.

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Chapter 1. Introduction

1.1 History of the study province

Khyber Pakhtunkhwa history is greatly influenced by its location. As the gateway to the subcontinent, it has a long turbulent history of invasions by those who sought the riches of India. In 1849, the province came under British rule. The British East India Company led many campaigns into areas controlled by the Pathan tribes and secured their confidence. Till the late 19th century there was no formal border between Afghanistan and Khyber Pakhtunkhwa. The Lord Curzon, inaugurated the province at ShahiBagh in 1902, and in 1931 it was elevated to the status of governor-ruled province. In 1936 there were spearheaded disobedience movements against British rule. Among them popular freedom movement was launched by Abdul Ghaffar Khan and his brother Dr. Khan Sahib. The province was granted self-government in 1937.

Source: (http://Kp.gov.pk/page/history_march_of_time).

The source to the above paragraph was provide from the Khyber Pakhtunkhwa provincial government website.

1.2 History of Land reforms

After independence, the government of Pakistan introduced land reforms in 1959, 1972, and 1977 to put an end to landlordism, to improve ownership patterns, to stabilize the smaller farms, and to prevent their further subdivision. But due to numerous exception clauses, all these land reforms were unsuccessful. In **KP** the provincial government in its individual capacity tried to abolish the Jagirdari system and the exploitation of tenants by Zamindars. Most important were the abolition of Inamdari and Jagirdari system in 1938 in the pre-partition era. The **KP** Tenancy Act 1950 and **KP** Protection and Restoration Act 1951 were enacted in the post-partition period. Despite these and the central government reforms of 1959, 1972, and 1977, the results were far from satisfactory. In 1981, 30 percent of all agricultural land was held by 0.5 percent of landowners who owned more than 150 acres per head (Khan 2012).

1.3 Features of Khyber Pakhtunkhwa

The climate of Khyber Pakhtunkhwa varies immensely for a region of its size, there are four seasons (spring, summer, autumn and winter). The province is spread over 12.77 percent of the total area of Pakistan with the cultivated area of 1.65 million hectares. Its plain areas are very fertile and some of the hilly areas also produce good crops. The major crops and fruits of the region are (Rice Wheat, Maize, Sugarcane, Cotton, Chilies, and Tobacco etc) and fruits crops are (Peach, Plum, Pear, Apricot etc).

also the province are rich of natural resources like gas, Oil fields, mines of marble, Gems Stone, etc., in Pakistan the largest producer in Sui Gas, Uranium, Electricity, Salt, lithium, Steel, Coila etc.

Source: (http://Kp.gov.pk/page/quickviewofkhyberpakhtunkhwa).

The source to the above paragraph was provide from the Khyber Pakhtunkhwa provincial government official website.

The total area of the Khyber Pakhtunkhwa is (100200 sq.km) 74521 km2 and comprises on three zones.

Northern Zone: A mountainous region full of natural attraction having 5 small and big rivers. The Northern part of the province is exceptionally rich in pleasing and interesting landscape, exotic valleys and dense pine forest.

Mid Part: It comprises of Peshawar Valley, a seat of different civilizations. Peshawar is the Capital of the Province. Charsada, Mardan, Swabi and Noshera are the surrounding area of Peshawar valley with rich and fertile soil and with spread irrigation Canals network system.

Southern Zone: Rugged dry hills and vast gravelly plains with patches of sandy agriculture fields. The natural lakes and thick forests of the province are safe haven for eco-tourism. Ghandhara remains testify the rich cultural heritage of the province.

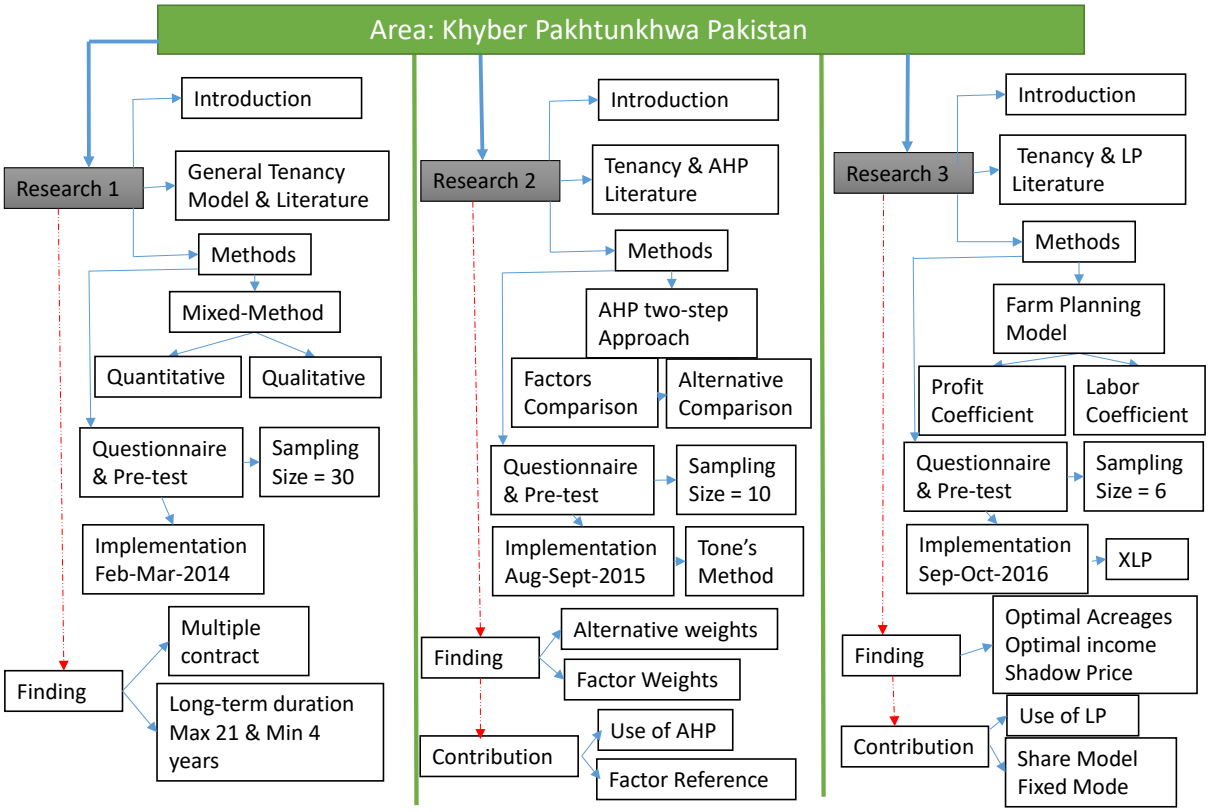
1.4 Over all objectives of the study

To investigate the actual situation about land tenancy contracts in the study area, also to discuss the contractual parameters and duration on the basis of each tenancy contract in the landlord, tenant relationship.

To find out the importance of each type of contract in the landlord-tenant relationship in the study area, also to check out the important factor, from landlord and tenant point of view in these land tenancy contracts by using AHP.

To present analysis technique by linear programming that can be combined into farm management linear programing model, to examine the economic effect of the four major crops grower as well as their production and income. Also, will be checked out the efficient decision making behavior of share and fixed rent contract tenants.

1.5 Research Summary Chart



1.6 Research Relationship

The first two studies were discussed the features of the land tenancy contracts in the landlord, tenant relation and the third one was based on the consultancy farm planning models for the targeted respondents. The relationship among these works are as follows:

1. Chapter 2 in Ph.D dissertation was the starting point of the work, provides the information based on the existing land tenancy types, features and their contractual parameters.
2. Chapter 3 of the dissertation was developed on the finding of first work. AHP approach was implied, to know what types of factors working behind the long-term duration of contracts and at a same time to distinguish the importance of each contract type.
3. After knowing the feature and contractual parameters of the land tenancy arrangements in the study area, we developed chapter 4 of the dissertation. For the purpose two farm planning models were developed based on their contract type. To facilitate the targeted farmers by giving benefit through proper knowledge about cropping combination. The two simplex tableau were developed base on their contractual parameters.

Map of the Study province

Figure 1.1 Map and profile of Province Khyber Pakhtunkhwa
Khyber Pakhtunkhwa is the North West side of Pakistan, the population of Khyber Pakhtunkhwa is 26.9 million, with the land area of 74,520 km².

1.7 Review of Literature

Review of Literature plays an important role in finding the remedy and solution of a particular problem. It helps us in doing the research work to work on it again and again and find out further information of a particular problem, which are hidden and need to be disclosed. Literature review is also important to identify the relevant research methodology and to specify correct analytical framework for the study in hand. Therefore, a brief review of some relevant literature is given in the following section.

The interpretation given by Eswaran and Kotwal (1985) is that it is used to overcome market imperfections other than that of land. If, for instance, (1) both management and supervision are important in production, (2). The landlord is more efficient at management while the tenant is more efficient at supervision, (3). Neither supervision nor management can be bought on the market for a fee, and then sharecropping may be a mechanism to effectively gain access to these two factors.

1.7.1 Fixed Wage Contract

Under this contract, the landlord makes all production decisions, performs all supervision and management, and is the residual claimant.

1.7.2 Fixed-Rent Contract

The tenant takes all the production decisions, performs all supervision and management, and the residual claimant.

1.7.3 Share Contract.

The two partners decide jointly on M and L, and each partner decides how much to contribute of the factor in which he is most efficient, that is, management "t1" by the landlord and "s2" supervision by tenant.

Finally, the landlord should compare the maximum levels of income achieved under the three alternative contracts, that is, $y_1^w, y_1^r and\ y_1^{sc}$ and choose the profitable contract.

1.8 Empirical studies based on Pakistan

Review 1. The first empirical study which presenting here is the "Impacts of tenancy arrangements on investment and efficiency" (Akhter Ali et al., 2012). In this study they used farm level data from the Punjab Province in Pakistan to analyze the impact of three tenancy contracts on investment in soil-improving and productivity-enhancing measures and farm productivity.

The theoretical framework of their study led to two hypotheses about the relationship between contractual arrangements and investment, as well as land rights and agriculture productivity. They specify the agriculture production function for the farm as

$$Y = f(X, T, N; Z),$$

The maximized profit of the farm are given by

$$\pi = \max_{X,T,N} \left[PY(X, T, N; Z) - WX - R(\theta, \delta) - CN \right],$$

They computed the cost of land as

$$R(\theta, \delta) = (1-\theta)\bar{R} + \theta\delta PY,$$

The maximized profit as expressed as a function of the price, the household endowments and characteristics, and the tenancy arrangements captured by the parameters as follow

$$\pi = \pi(P, W, C, Z, \theta, \delta).$$

The application of Hoteling's lemma to any well-specified profit function, yield the reduced-form specification for both conventional (labor) and nonconventional (organic manure, green manure, and chemical fertilizer) input demand and output supply

$$X = X(P, W, C, Z, \theta, \delta)$$
$$T = T(P, W, C, Z, \theta, \delta)$$
$$N = N(P, W, C, Z, \theta, \delta)$$
$$Y = Y(P, W, C, Z, \theta, \delta).$$

The equations indicate that profits, input demand, and output supply are influenced by the tenancy arrangement, farm and household characteristics, output price, and input prices.

The empirical strategy they employed for, an instrumental variable approach to examine the impacts of different tenure regimes on output per hectare, account for farm and household characteristics. Also for the censored nature of the investment decision variables, they employed the tobit specification to capture the extent of investment in soil-improving measures. Expressed as;

$$J_{im}^{*} = \beta_{im} Q_{im} + \gamma_{im} Z_{im} + \mu_{im},$$

$$J_{im} = \begin{Bmatrix} J_{im}^{*} & if \;\; J_{im}^{*} > 0 \\ 0 & otherwise \end{Bmatrix},$$

They specify tenancy arrangements as function of its determinants in the following regression

$$Q_{im} = J_{im} \psi_{im} + \gamma_{im} Z_{im} + \xi_{im},$$

The test for endogeneity is developed by,

$$\mu_{im} = \xi_{im} \phi_{im} + \nu_{im},$$

Then produces the conditional model

$$J_{im}^{*} = Q_{im} \tau_{im} + \xi_{im} \phi_{im} + \nu_{im}.$$

Review 2. "Incomplete contracts and investment: a study of land tenancy in Pakistan" (Jacoby and Mansuri, 2002). They point out, land specific investment is lower on leased plots than on owned plots cultivated by the same household, even after correcting for the effects of adverse selection in the leasing market. Differences in tenure security appear to be largely driven by heterogeneity across landlords in their willingness to commit to long-term relationships, suggested that some landlords value reputation more than others. Their empirical analysis draws upon a new nationally representative rural household survey (PRHS), which was completed in late 2001. To derive the implications, they incorporated investment into a standard limited liability model of land tenancy.

The econometric framework of their study based on the regression model for FYM use,

$$M_{ci} = \alpha L_{ci} + \beta X_{ci} + \nu_{c} + \varepsilon_{ci}$$

Review 3. "Impact of non-farm work and land tenancy contracts on soil conservation measures" (Kousar and Abdulai 2014). They employed multivariate tobit model that accounts for potential endogeneity between the intensity of investment and the non-farm work and tenancy arrangement variables is estimated for 341 rural households in Punjab province of Pakistan. Also instrumental variable approach is used to analyze the impact of tenancy arrangements and non-farm work on farm productivity.

Review 4. "Land tenancy and non-contractible investment in rural Pakistan" (Jacoby and Mansuri 2008). They used plot-level data from rural Pakistan and find that non-contractible investment is underprovided on tenanted land, even after controlling for endogeneity of leasing decisions. Their evidence also indicates that moral hazard in investment effort alone cannot explain this inefficiency. They further

show that a considerable portion of the variation in tenancy duration, and hence the security of tenure is due to heterogeneity across landlords.

1.9 General review about land tenancy

Abhijit V. Banerjee 2004 described indeed, there is considerable evidence showing that the landlord-tenant relationship is typically a complex long-term informal contract with eviction threats often explicitly used is an incentive device.

Barrett, 2005 explained that, Farmers care not only for material satisfaction, but also about the values of social interaction and they willingly pay dearly for these.

Sadoulet et al., 1997 described The existence of kinship relations between landlords and share tenants may contribute to higher trust and confidence in which cheating is less likely to occur, reduce the conflict of interest, offer longer contractual relationship, and lead to interlinked transactions particularly for assistance through stages of the life cycle and mutual insurance.

Rahmato, 1984, stated that, the threats of eviction were a potent weapon in the hand of landlord and the tent over whom the danger of unemployment and destitution hung like the sword of Damocles, had no alternative but to accommodate all the demands of his landlord.

Newbery 1974 stated that the output share in a share contract is not a price-like variable, and should not therefore be treated as a given by individual who are otherwise price-takers in a competitive model has been made by him. He was commenting on Bardhan and Srinivasan's (1971) general equilibrium formalization of the misallocation arising from sharecropping, argued by Marshall I his famous footnote. Since then, numerous authors have made similar observation.

Jaynes (1982, 1984) stated that in any event, his construct is not meant to provide a realistic solution to modelling the determination of equilibrium shares. His own explanation relies on a farm of capital market imperfection and does not assume that all individuals take the output share in share contract.

Alston, Datta, and Nugent (1984) described that another way round non-existence of equilibrium while maintaining the assumption of share-taking behavior is that but this has its own problems. A better alternative is to do away with assumption of share-taking behavior. This is normally done in models of sharecropping.

Shetty (1988) model explained that the optimal landlords-tenant's ratio is 1. Each potential tenant has the same reservation expected utility, determined by some other opportunities. Tenants are divided into several classes, according to their wealth levels; otherwise they are identical. There are moral hazards, so landlord's choice contract parameters anticipating the tenants 'effort responses. Wealthier tenants are more desirable, because they are less likely to default on agreed payments, and because they work harder in equilibrium. Hence landlords compete for wealthier tenants.

Eswaran-Kotwal permanent labor contract model, when work effort cannot be effectively monitored and enforced, the fixed-rent contract dominates the share and

fixed-wage contracts in the absence of risk aversion simply because an increase in α always improves the efficiency of the contract. In contrast, if the contracting parties are concerned with income risk and work effort is unenforceable, a tradeoff arises between providing incentives and sharing risk and these results in the choice of a share contract. This implies that, if some form of the tradeoff relation emerges with an increase in α, the share contract will be chosen in equilibrium.

The principal chooses the contract to offer in full knowledge of the optimizing behavior of the agent, under the constraint that the contract be at least as attractive to the agent as the agent's alternative opportunities for employing his resources (Bell, 1989).From the Marshallian theory of sharecropping, it is well known that output sharing creates disincentives for the tenant to work (Otsuka and Hayami, 1988). Sharecropping has been explained as a mechanism for risk sharing and for screening of tenants (Cheung, 1969, Newbery and Stiglitz, 1979). (Bardhan, 1983, Basu, 1984). The decision-making unit its production and consumption in accordance with its specific effective prices, the transaction occurs within the decision-making unit itself. Contracting with an outside agent and completing the exchange through a face-to-face transaction as opposed to an open-market transaction. (Land, labor, Credit, products, management, supervision), Analyzing this subject takes the vast and fascinating theory of agrarian institutions.

The most attractive view of tenancy is that it substitutes for the absence or imperfections of a market for some factor inputs besides land. The absence or incompleteness of markets can typically result from the high cost of quality enforcement. Recent literature has pointed out technical know-how (Joseph Reid, 1977), managerial ability (Bell-Pinhas Zusman, 1979), bullocks (Nicholas Stern, 1982), credit (Gerald Jaynes, 1982), and family labor (Pant, 1983) as examples of factors for which market are highly imperfect.

William Hallagan (1978) and David Newbery-Joseph Stiglitz was used screening model to explain the existence of different contracts. The main problem which is address by sharecropping is to be the imperfection of information about tenant's abilities; different types contracts are needed to find out tenants abilities, and also assume that the ignorance on the part of landlords about tenants abilities unsuitable for most rural communities.

Following Reid (1977) we envisage the landlord and tenant as both contributing unmarked resources in a sharecropping arrangement. We view sharecropping as a partnership arrangement in which both agents have incentives to self-monitor.

Otsuka, Chuma and Hayami,(1992) described that the population of agrarian economies is stratified into a spectrum of peasant sub-classes ranging from landless laborers to non-cultivating landlords who are organized by various land tenancy and labor employments contracts. Even today this peasant production mode provides the livelihood for the majority of mankind.

Eswaran and Kotwal 1985b and Roumasset Uy 1987 suggested that separate analyses of land and labor contracts have resulted in theoretical confusion as well as questionable interpretation of empirical data, (those drawing inferences about the

relative efficiency of alternative contracts).The existing model do not explicitly consider the facts that the majority of farming H.H, S are owner cultivators and that virtually all cultivating H.H,S, including tenant H.H,S, hire the casual laborers during the peak seasons.

The models of labor employment explain the two-tiered structure of agrarian labor markets in which permanent or attached laborers are employed for a crop season or longer receive higher remuneration than casual laborers employed on daily basis (P. Bardhan 1984, Chs. 4 and 5; Eswaran and Kotwal 1985a).This work base on the theory of the principle-agent relationship Or, briefly, agency theory. (Holmstrom 1987 and Daniel Leviathan 1988).The concerned optimum contract principal between the owner and agent of the resource.

Adam Smith 1776 and John Stuart Mill (1848) analyzed the relative merits of fixed –rent leasehold tenancy pervasive in England and share tenancy pervasive in France. Emphasized the different investment and work incentives to tenants under alternative contracts. The Alfred Marshall (1890) formalized the efficiency implications of share vs. fixed-rent contracts.

Steven Cheung 1969; C. J. Bliss and N. H. Stern 1982; and Gerald Jaynes 1984 described that for survey of classical thought on share tenancy; Marshall maintains that share tenancy results in inefficient resource allocation because the share tenant receives as his marginal revenue only a fraction of the marginal product of labor and this reduces his work incentives.

Marshall and later, D. Gale Johnson (1950), and Cheung (1969) argued that, if the tenant work effort can be costlessly observed and enforced by landlord , resource allocation under share tenancy can be as efficient as under owner cultivation and fixed-rent tenancy. The requirement of costless monitoring, however, has been criticized as unrealistic. (Bardhan and Srinivasan 1971; Bell and Zusman 1976; and Bell 1977). If the tenant's effort is costly to monitor, then the share contract may be rationalized as a risk sharing device (Stiglitz 1974).

Bell and Braverman (1980) stated that in theories of land and labor contracts, it is not surprising to assume that share tenancy contracts are difficult to enforce whereas wage labor contracts are costlessly enforced (Bardhan 1984, chs. 4 and 5, with share tenancy model of Bardhan and Srinivasan 1971 and Bardhan 1984, ch. 10 and 11). Such inconsistent assumptions have led to the conclusion of "the supremacy of wage labor over land tenancy contract".

Chapter 2 Baseline Study

2.1 Background

Agriculture is the backbone of the economy of Pakistan. It accounts for 22% of the country's GDP and provides employment to about 45% of the total employed labor in the country. Crop production is a major contributor to the value addition in the agricultural sector. Major and minor crops constitute 33% and 12%, respectively, of the overall value addition in agriculture (Government of Pakistan 2009). However, Khyber Pakhtunkhwa is 10.17 million hectares, which is 13% of Pakistan's total area (Government of KP 2014). However, due to well irrigation system and fertile soil, agriculture activities, also land tenure arrangements are more general in the mid-part of the province like (Mardan, Nowshera, Swabi, Charsada and Peshawar).

Pakistan is situated in Southern Asia, bordering Afghanistan 2,430 km, China 523 km, India 2,912 km, Iran 909 km. The Capital of the country is Islamabad, Population: 159,196,336 (July 2004). Ethnic of the country is based on Punjabi, Sindhi, Pashtun (Pathan), Baloch, Muhajir (immigrants from India at the time of partition and their descendants). The religion of the country is based on the ratio of Muslim 97%, Christian, Hindu, and Sikh 3%, the official language of Pakistan is Urdu. Islam is practiced by the majority of Pakistanis (Heer, 2010).

From the independence Pakistan has engaged in feudal land tenure system, the unfair distribution of natural resources which made highly conflict society and division of peoples in upper, middle and lower classes. According to the USAID (2010) land tenure and property rights are one aspect of chronic poverty, corruption, undermining economic growth and fueling conflict. Moreover, that a more equal distribution of land might result in significant gain in the economy (Debraj, Ray, 1998 Ch. 12 P. 456). Also the government was taken many initiative towards land reform regulation over the past many years to improve the landlord tenant relationship in the country but these legislations were still not existing.

Early post-independence period, redistribution land reforms was popular in South and Southeast Asian countries, even though its implementation failed because of strong opposition of the landed class (Like, India, Pakistan, Bangladesh and Nepal), (Herring 1983; Ladejinsky 1977). However most of the landlords and tenants in Pakistan and particularly in Khyber Pakhtunkhwa were involved in traditional land tenancy contracts, which were manage informally by these landlords; also they hire the landless laborers from a competitive labor market for different land tenancy contracts and make agriculture production for his own household consumption as well as for the region.

According to the World Bank (2009), 2% of households control more than 45% of all land, which severely constraining agricultural production competitiveness and livelihood opportunities.

In rural Khyber Pakhtunkhwa, land is still existing the major form of wealth and family class differences among the rural people. According to the G.M. Arif (2004), the land tenure defines the social and political structures of a society, and determines the course of economic development, distribution of income and wealth.

To clarify the system of land tenancy, we must explain that tenancy relationships are surrounding within the larger social structure of Pashtuns society, with their own traditional norms. At present, three variants of private or individual tenure exist in Pakistan (Naqvi et al; 1989). The first variant is owner-cultivation, second sharecropping contract and third fixed-rent tenancy (Kousar and Abdulai 2015, Ali et al 2012, Hussain 1988).

Table 2.1. Shows the present land tenancy types and their contractual parameters in the study area. Also explained the percent share of the land owner and tenant in each type of contract based on the contractual parameters in the target area.

2.2 Theoretical Explanation of the Land Tenancy Contract Types in the Study Area

2.2.1 Owner-cultivation

In the research area, those respondents which utilized their natural resources by himself and were making agriculture production for their household consumption. In this case, the land owner taken all the responsibilities of management and supervision related to farm production by using his own family labors or some time hiring causal labor, especially in the peak cropping season (growing or harvesting). The landlord could self-cultivate by hiring unskilled labor and providing both supervision and management himself (Eswaran and Kotwal 1985).

However, Bijit (2003) defined, the system under which landowner cultivates his land himself with the use of family labors only and minimal use of hired labor. On the other hand, due to the availability of time, very few owner-cultivators interviewed during the field survey in the selected villages. Generally, in the study district, the availability of farm cultivated area among the majority peoples were small (< 4 acre) and medium size and very small portion of peoples occupied large cultivated area. The distribution of land and family owned resources among farming households relatively homogenous, so efficient resource can be achieved without tenancy transaction (Otsuka et al. 1992).

The reasons due to which respondents were working as a self-cultivator are; like, the availability of own family labor, no governmental jobs or owned private business as well as education, all these constraints in the research area restrict the individual to work on his own piece of land. However, the statistical evidence, in case of owner-cultivator from the selected study villages related to, Age (years), Education (years), Cultivated area (acre) and Number of family labor (male) are reported.

2.2.2 Share contract:

In the landlord-tenant relationship sharecropping were the most dominant form of land tenancy arrangements in the study area, which were working in different

flavors, so the most general one is the 50:50 ratios, the 75:25 crop share is also existing. The task division between them are decided with mutual consultation related to which crop to grow and input cost sharing, fertilizer, pesticide, weedicide and so on, also the yield maybe divided on equal basis immediate after the harvest. However, sharecropping contract, an arrangement is made between the landlord and the operator, such that part of the output is given to the landlord as compensation for using the land (Abdulai et al. 2011).

Thus sharecropping emerges as a way to share, not just the output of the productive activity, but the risk that is associated with it as well (Debraj Ray, 1998 ch. 12 P. 434). However, Reid (1977) predict, the landlord and tenant as both contributing un-marketed resources in a sharecropping arrangements. The landlord and tenant could make share contract in which the former provides management and the latter supervision, and output is shared (Eswaran and 1985).

On the other hand, the initial contract term and condition in the country as whole, specifically in research area were working with verbal commitment, traditional norms and the decision rule or unwritten commitments are very hard to violate during the contract period. In case, if a very severe conflict arises between them, either party must be informing before the end of the contract time. However, the initial contract duration is one cropping year (e.g., two crop season), also the final decision power in share tenancy exist in the landlord hand in the selected villages. Moreover, the tenant status and decision making power in the share contract compared to fixed-rent contract were low in the research area.

Moreover, Steven Cheung (1969) defined, that share cropping offers the advantage of risk sharing while the other two contracts characterized by lower transaction cost.

2.2.3 Fixed-rent contract:

In the study villages the second dominant contract are fixed-rent tenancy, in which the tenant pays cash money to the land owner. So in this case the tenant taken all the responsibility related to management and supervision, decide about farm production which is more profitable for him. However, Eswaran and Kotwal (1985) defines, that landlord lease out the land to a tenant for fixed lump sum rental, the tenant hires unskilled labor and provide both management and supervisor. If the enforcement of tenant efforts is the defining problem of the contract, the fixed rent contract dominates any other contract (Cheung 1969).

On the other hand, the task division and decision making power of the tenant in fixed contract are similar like the landlord in owner cultivation, during the contract period. The initial contract duration for fixed-rent contract in the research area is one year with verbal norms and mostly the payment will pay after the harvest of cash crop, for example tobacco and sugarcane, also some time it exists in written form, when a landlord have need of money for family oriented issues, (like son or daughter marriages or serious hospital issue etc.), then the initial duration were ranging from 1 to 5 years. In this case, the landlord received all money in advance.

The present way of payment per acre, especially in the selected villages and the study province as whole were defending on the fertility of the soil and irrigation system like equipped with canal, tube-well or unirrigated. So in our case, all these three villages have canal irrigation system and fertile soil. However, the landlord charges per acre in village Kadame were ranging from Rs 30,000 to 35,000, in Fazleabad and Kaludher Rs 35,000 – 45,000.

However, the tenant has the incentive to maximize the surplus under a fixed rental contract where he keeps the entire output and pays only a fixed rent to the landlord, who has the bargaining power to extract the entire surplus by appropriately determining the rent (Sen 2011, Hritonenko et al 2014).

2.2.4 Mixed contract:

In the landlord-tenant relationship, we found a contract in which one tenant was working with more than two different landlords, both in share and fixed-rent contract. Due to the long settled of the tenant families in these villages, they know the landlord families as well as their relatives. However, the occupied farm cultivated area in acre of the respondents which involved in multiple contracts, the area in acre under share contract was higher than those of fixed contract. We observed from these respondents, that they made the fixed contract with the relative of share landlord, also some land they occupied in fixed are women oriented.

The mixing of different contracts may be difficult to accomplish in practice, it all depends on the structure of the market (Debraj Ray, 1998 ch. 12 P. 436). However, Newbery (1977) described, even if mixing is possible to find a safe asset, such as a fixed-wage contract that is lacking in all uncertainty, in such circumstances sharecropping may well dominates whatever can be achieved by mixing fixed-rent tenancy with a risky wage contract.

2.3 Theoretical Explanation of the Contract Duration in the Research Area

In the study area the land tenancy relationship in which both parties, landlords and tenants, were involve with annual years of tenancy contracts, which may be more than two crop seasons. Under these contracts, most tenants stayed with the same landlords for a number of years, also continuously involved in producing agricultural products for their own household consumption as well as for the country and region.

In the relationship of the sample respondent in contract duration, the options of increasing punishment and reward, through inter-linked contracts, provide extra work incentives to the tenant. Because the landlords support their tenant through advance credit, both in crops peak season and his family oriented issues, like marriage, death and political circumstances, especially in share tenancy. Sadoulet et al (1997) described the existence of kinship relations between landlords and tenants, and the characteristics of share tenants which may contribute to higher trust and confidence. For example, cheating is less likely to occur, reducing the conflict of interest, offering longer contractual relationship through stages of the life cycle and mutual insurance.

Especially for long-term duration of the contract it is important to discuss about the following points which leads to best relationship between landlords and tenants for their future contracts with some famous literature.

2.3.1 Reputation

In our study area the landless farm population were usually long settled in the same district or village's community and people know each other quite well through an efficient mouth to mouth communication with some traditional norms, except those who were come seasonally to the area. So reputation is certainly playing one of the important roles in landlord-tenant relationships. For example, if anyone interrupt these contract norms this fact soon become known in the close village community, which will make troubles for both parties in future tenancy arrangements.

In these three selected villages therefore for the long-term contract duration the tenant should be concerned with his reputation. This means he is more likely to care for the land as well as for landlord family and developed good social relationship with them, also with neighbor tenants. However, we observed that tenants made investment more in the land during these long-term duration of tenancy contracts and were more efficient compared to those tenants which were involve in short-term contracts, at shortest one crop season, or working seasonally in our research area. Thus in the landlord-tenant relationship reputation will play key role for the continuation of these long-term duration in the selected villages. However, the loss of the reputation from both parties were decrease the expectance of these long-term contracts duration in the study area. So, if there is a failure to take the action prescribed by the contract that results in a loss of reputation that causes such a reduction in welfare, and at last the contract become effectively enforceable (Holmstrom 1983).

Also interlink contract (like borrowing credits or enjoying other kinds of supports from his landlord) with reputation were working and both parties did actions according to the situations and made co-operation with each other, rather than agriculture related issues. For instance, they helped out each other, especially in their traditionally ways of marriages, death circumstances and politically support as well.

Otsuka et al. (1992) in his agrarian studies pointed out, major puzzles, such as the prevalence of the 50:50 sharing ratio in tenancy, the absence of fixed payments in share tenancy, the equality of output and cost sharing rates, and the low interest rate charged on credit provided by the landlord to his tenanted laborer, cannot be understood without considering the inter-linking of contracts.

2.3.2 Eviction threats

The eviction threats are also one of the main points in this research, which works like a weapon for the landlords and they use it according to the circumstances, related to crops and tenancy contracts in the study villages. However, Banerjee and Ghatak (2004) described indeed, there is considerable evidence showing that the landlord-tenant relationship is typically a complex long-term informal contract with eviction threats often explicitly used as one of the incentive devices. In contrast, the degree to

which a tenant actually uses threats of eviction, however, may depend on the degree of social distance inherent in landlords-tenant relation (Kassie and Holden 2007).

Also they were control the unobservable level efforts of the tenant to make sure the first-best output in share contract and rent per year in fixed-rent contract in the selected three villages. James (1974) described that under certain conditions, however, it is possible for the principal to elicit approximately the first-best effort level from the agent by threatening him with an arbitrarily severe penalty whenever a very small output may be observed.

We heard from the sample respondents, that most landlords tend to make the final discussion with their all tenants at one time in a year, especially after the harvest of cash crops (tobacco and sugarcane) about the total cost on production, yield, and income, (which was grown in the cropping year) in (50:50) share tenancy or rent per year from fixed-rent, in his home.

After the final discussion the landlord pointed out the weak points of the tenant from the previous year contract like (low productivity or tenant engaged in other activity) in share contract and timely payment of rent in fixed contract and give some threats related to his future contract, so to achieve the first best efficiency from the future contract. Moreover, Debraj Ray, (1998 Ch. 12, P 463) described eviction as another instrument that the landlord might use to provide incentives and discussed situations in which eviction clauses may be implicit or explicit in tenancy arrangements.

2.3.3 Efficiency and behavior

In the study area we pointed out that the first best efficiency of tenancy contracts in the landlord-tenant relationship are achieved, because of continuously working in the same farm from many years, due to which they invest more in the land, also tenants developed highly socialized and reliable environment in these long-term relationship with landlord family, as well as their efficient skills in agriculture production. This means these tenancy arrangements can be long-term contracts. Barrett (2005) explained that, farmers are taking care not only of material satisfaction, but also of the values of social interaction and they willingly pay dearly for these.

Also the availability of various choices of these land tenancy arrangement, which were working in different form of share and fixed-rent contract. On the other hand, the government institutional land reform laws still do not exist in the country as a whole and specifically in research area. We observed that those tenants who involved in short-term (one crop season) land tenancy contract or were working in labor contracts in the selected villages, their first-best efficiency is not reinstated, because of unenforceable work efforts of these landless laborer, with their behavioral aspect as well, comparatively those which were involve in long-term contract duration.

In agrarian literature Otsuka et al. (1992) explained that the significant inefficiency of share tenancy is not common in areas where both share and fixed-rent contracts are available options. Inefficiency tends to arise where contract choice is institutionally restricted. So it is clarified from the results that there is the availability

of wide range of choices in informal traditional land tenancy arrangements in the study area, that the good decision opportunity to the landless labors are provided and they are making competent decision among them. However, the enforcement mechanism will be stronger in more tightly structured communities in which the rights and obligations of each member are more clearly defined by tradition (Hayami and Kikuchi 1981).

2.3.4 Wealthier and Skillful tenants

In our research area, we mainly focused on the tenants who were comparatively wealthier than other tenants, however in the study area, due to competitive labor market, when a landlord want to make contract with a tenant, at first landlords ask how many own family male members and which kinds of agriculture technology, like Bullocks, Tractor, other Equipment's and so on, they have. Secondly, the landlords check his own experiences of each tenant, like how long the tenant had been working in agriculture sector.

Especially in case of 50:50 share contract, the landlords tend to want to share agriculture production risk with tenants, who make every effort to make the first best output from the contract. On the other hand, in case of fixed-rent tenancy, the landlord tends to check the financial position of the tenant because the land owner wants to make sure his per year rent, might be cash money in many cases, from the contract. However, majority of the selected respondents in research area involved in share and fixed-rent tenancy contracts and few of them were owner cultivator. So all these characteristics in the landlord-tenant relationship in the study area were playing important role for the long-term contract duration.

Bell and Zusman (1989), explained that empirical research, which attempts to identify the determinants of contract choice with due consideration of household characteristics, is still lacking. Also Shetty (1988) stated in his paper that differences in tenant's wealth imply corresponding differences in liability when default is possible on fixed rental commitments. The selection of tenants and the contract terms they receive thus depend on wealth with wealthier tenants being preferred and receiving fixed rent contracts. His land endowment is largely hereditary, and is out of proportion to his farming experience and skill.

2.4 The Objectives of the Study

The objective of this study is to investigate the actual situation about land tenancy contracts in the study area, also to discuss the contractual parameters and duration on the basis of each tenancy contract in the landlord, tenant relationship.

2.5 Combination of the Study:

Mixed methods will be applied to the assumptions in understating to the qualitative and quantitative analysis of the data to find out about the socio-economic as well as the contribution impact of the tenant in the society in the region.

Through the combination of the qualitative and quantitative analysis we will justify about the three different villages and their contractual formation for the tenancy contract and their features.

2.6 Dynamics of the Study:

There are four types of contracts in the selected villages which are Fixed Contract, Share Contract, Both Fixed and Share contract as well as Owner Cultivation. The research will be based on the literature and features of the area according to the theories and will be analyzed through the specific mentioned conditions in the study area.

Both the tenants and the landlords are involved in these traditional types of contracts. The main focus for the study is the behavior of the tenant and its effect on the production in the region.

2.7 Structure of the Study

The thesis is made up of parts. Remaining Section following this introduction is organized as follows,

In part 1, general introduction related to study area and review of literature of previous studies on overview of the theories of tenancy contracts and the relationship between landlord and the tenants. In this section also explain the general model of three land tenancy contracts.

In Part 2, Introduces area of the study, this includes environmental and social economical characteristics of the area. It also introduces statistics used in the study and model for tenancy contracts is used for estimating the results of the study.

In Part 3, the Evaluation of Land Tenancy Contracts by using the Analytical Hierarchy Process.

In Part 4, the economic evaluation of contractual choices with farm planning.

In part 5, Observation and models results.

The last part is consisted on conclusion and recommendations for policy makers.

2.8 Methodological Structure of the study

This section of the chapter describes the research site sample design and research instrument used for the collection and analysis of the data. The main purpose of this research was to find out the features and relationship between landlords and tenants in the study area in district Swabi Khyber Pakhtunkhwa Pakistan.

2.8.1 Study Area

The selected study area was District Swabi, which is situated in Khyber Pakhtunkhwa Pakistan. The majority of living people in the study area are Pashtuns, their locally speaking language is Pashto, and their religion is Islam the majority of people were working in agriculture sector, which were play important role in the GDP of the **KP** province as well as for the whole country and region. The total square Kilometers area of District Swabi is 1543. The total population census 1998 is 1026804 persons, in which 50.31% are male and 49.69% are female in the study area. The Urban population is consisting of 17.45 % and rural population is consisting of 82.55%. The average household size is 7.7 while the literacy ratio is 36.0% in which male ratio is 54.0% and female ratio is 18.3% in the district Swabi. (P.B.S 2012)

Figure 2.1 the Map of the Study Area

It shows the administrative units and union councils of the districts. The red line shows the boundaries with the other District of Khyber Pakhtunkhwa, Pakistan.

Source: Google Map

2.8.2 Survey Design

2.8.2.1 Sampling

The Questionnaire was pre-tested in the research area. After this pre-test, 30 respondents were selected in the three villages of District Swabi. The landlords who have reputation in these three villages helped us and made advices in order to select 30 respondents. Each respondent has excellent skills of agricultural production, and producing all or some of three major crops (Tobacco, Sugarcane and Wheat).

As results, this sampling has the potential for bias, which these respondents are comparatively skillful in agricultural production and management.

The number of sampled farmers that were selected from each village of the study area is given:

2.8.2.2 Questionnaire

A comprehensive interview schedule/questionnaire was prepared to collect the primary data from the respondents. The interview schedule was pre-tested in study area so as to improve it by further including all relevant questions. Each (respondent) was interviewed personally at his home/or/field.

2.8.2.3 Implementation

The interview schedule was pre-tested in the field accordingly on 1st Feb 2014 which was finished in 15th of March 2014. From which we were collected information about different tenancy contracts, their duration and data related to three major crops (wheat, tobacco, sugarcane) which were grown in year 2013. During this one and half month, I made interviews for both the landlords and tenants in their houses.

Table 2.2 the Selection of Sampled Tenants in the Study Area

Villages	Sample Size
Kadame	13
Kludair	7
Fazle-Abad	10
Total	30

Source: Preliminary Survey 2014 Feb 1st.

2.9 Basic Statistics

The collected data was tabulated and analyzed by using MS Excel and SPSS (statistical Package for Social Sciences) computer programs in order to achieve the specific objectives i.e. to analyze the mean and standard deviation of the Age, Education, Family size and Farm size group of each of the respondents from three selected villages and were also to calculate the maximum and minimum duration of different tenancy contracts.

2.9.1 Current statistical situation of the contracts duration in the study area.

This section is based on the duration of the contract which has explained with different features of the sample respondents.

The tenancy contracts and its duration is a very important point in this research work, we made four different duration categories of the selected respondents with their villages and contracts duration.

Table 2.3 shows the distribution and the statistical values of the sample respondents about contract duration in the three selected villages.

So in village wise comparison, the maximum duration of village Kadame 21 years, Fazleabad 20 and Kaludher 15, with reported mean values are 11.0, 10.0 and 9.0 respectively. In the four contract duration categories, the respondents belong to "Duration 6-10", their mean value was 8.5. The second highest category was "Duration 0-5", with mean value 4.6, the other two duration categories "Duration 11-15" and "Duration 16-"were the same number of respondents, with their mean values 15.0 and 19.4 as reported. So in the village and contract duration wise mean value was 10.2 in years and its standard deviation was 5.5 of the sample respondents. These long-term durations of the respondent's reveal that, they play the main role in producing agricultural products for their own family consumption as well as for landlord family and were making contribution in the socio-economics for the whole country and region.

From the results of long-term duration of the contracts the new idea can be raised, that the landlord-tenant relation was working in strong mood. We observed from the selected respondents, that both parties feel much secure in these long-term duration of the contracts, especially in side of the tenants. Banerjee and Ghatak (2004) explored that in the context of agricultural tenancy, it is widely believed that tenants who have secure tenure will tend to invest more in the land, which seems to be a straightforward corollary of this preposition. However, in the country a considerable portion of the variation in tenancy duration, and hence in the security of tenure, is due to heterogeneity across landlords (Jacoby and Mansuri 2008).

Also in these relations, landlords who had enough decision making power, so they have easily monitor tenant behavior towards agricultural production because he had the enough power to implement his decision on his share tenant. On the other hand, in lease case, the landlord has restricted, like (about crop selection, input use

etc.) during the period of the contract, but still occupied some power, like caring of irrigation channels, field boundaries etc.

Table 2.4 shows the age features of the sample respondent's bases on their duration of the contracts in the study area. Due to the inefficient attention of the previous researches work towards these features in the land tenancy arrangements, we were exploring each characteristics of the sampled respondents in three different villages and pointed out that in village Kadame, the majority of tenants were younger with their mean value 43.7 as compared to other two villages, their mean values were 52.6 and 55.3 respectively. On the other hand, in comparison with their contract duration, the respondents involved in duration category (6-10) their mean reported value 43.8 which were comparatively younger, with highest numbers than those which involved in other duration categories. So the age in years of the sample respondents in different villages and contract duration groups, the total mean years age was 49.4, variation 14.2, their maximum, minimum values were 70 and 24 as reported from the study area. Otsuka et al. (1992), pointed out that existing studies do not pay sufficient attention to the characteristics of households, market conditions, and the community structure that would determine relative contractual efficiency and contract choices.

Table 2.5 shows the education in years of the sampled respondents with their duration. So in the village wise comparison the respondents in Kadame, their number of year of education were high with mean value 4.5, compared to other two selected villages, then we were made educational comparison of the sampled respondents with their land tenancy contract duration, from which the respondents belong to 6-10 years duration, their year of education and numbers were high with their average value 6.6, compared to those respondents which involved in other contract duration categories 0-5, 11-15 and above 16 years respectively. We assumed in the study area that comparison of education status in the relationship between landlord and tenant, the education status of the landlord family was high because of highly available resources, and the tenant family education status were not high, depending on their low wealth and available resources. Rao (1971) described that landlord families, with their higher wealth and social standing, are likely to have required better education compared to tenant families.

Table 2.6 shows the number of male family labors in the selected three villages, then we were spread out all the respondents in four different parts, the higher number of male labor were working in village Kludair, with their mean value 5.6, the maximum number of male family labors was 15 and minimum was 2 as depicted, comparatively higher than in other two selected villages. In comparison with duration of the contracts, the duration 6-10 with the mean value 3.3 was the highest number of respondents in the study area. The second highest respondents who involved in the study area with the duration of 0-5 and its mean value was 4.3, the lowest number of respondents was 5 for both the duration of 11-15 and above 16 their reported mean value was 6.0 and 3.4 respectively. In the research area it very hard for the landlord to cultivate his own land, because some of them were engaged in their own private

business and some were working in governmental sector, also due to the lack of latest agricultural technological equipment's in the study area as well in the region, the agriculture production required high intensive labors, so they were hiring some landless labor to utilize their natural resources and grow agriculture crops, so the landlords were making different forms of land tenancy and labor contracts with these landless laborers. However we observed, in our research area, that to monitor the landless labor efforts in permanent labor contract, it's very hard and costly for landlord. The institution of permanent labor creates a variety in agricultural labor contracts that is of intrinsic interest, it may be both better off and worse off than those in causal labor contracts (Debraj Ray, 1998 Ch. 13 P. 505). However in India, Pakistan, the permanent labor contract is closely associated with caste status: permanent laborers belongs to the lower castes and their employers to the higher caste (Thorner and Thorner 1962; Breman 1974; P. Bardhan 1984, Ch. 3 and George 1987). Also he was willing to give his land on share and fixed-rent contracts or he become an owner-cultivator by hiring some causal labor.

Table 2.7 shows the farm size cultivated area in acre of the sample respondents with their tenancy contract duration in the study area. The differences of the villages show that farm size in village Kludair were high with their reported mean value 9.3 and their maximum cultivated area was 22 acres, as compared with other two selected villages, their means values were 6.3 and 7.7 acre respectively. In the comparison with duration years of the contract the average cultivated area in acre of the respondents in duration 11-15 was 11.4, higher than those respondents which belongs from other duration categories. In the study area majority of farm size were small and medium, also most of the landlords and tenants were in relations of share tenancy (50:50) ratio. Because the landlord was living together with his tenants in the same village or neighbor to the tenant village. So the landlord has advantage of monitoring his tenants' work effort, compared with absentee landlord, which were living outside from the research area or living outside of the country. We observed that, due to the insufficient attention of governmental sector towards land resources in the country as whole and especially in research province, highly fertile agriculture farm cultivated area were rapidly changes to the housing scheme as well as super markets. Also highly increased population over the past years, the most severe problem of the research villages, that the present growers highly restricted to grow different fruits crops like melon, orang, water melon etc., and sugarcane as well. Also we checked out such type of characteristics in the long-term duration contract relationship of the sample respondents in research area.

2.9.2 The types of the tenancy contracts with empirical results in study area

To explain the four types of contracts in study area we learned from the literature that among these contracts the share tenancy is more common in Asia. So the information which was collected from the selected respondents provides evidence that in Pakistan, especially in Khyber Pakhtunkhwa the share tenancy was dominant as compare to fixed-rent and fixe-wage contracts. On the other hand, a landlord

personal capacity to monitor farm work of his tenant on daily or weekly basis are limited in the study area, however large landowner tends to choose fixed-rent tenancy, also landlords, who have good experienced in the field of farming and have the ability to monitor their tenant's efforts and behavior on daily or monthly basis or from the yield, also has a good management skills are involved in share contract. However, in Eswaran and Kotwal (1985) permanent labor contract model, when work effort cannot be effectively monitored and enforced, the fixed-rent contract dominates the share and fixed-wage contracts in the absence of risk aversion. In contrast, if the contracting parties are concerned with income risk and work effort is unenforceable, a trade-off arises between providing incentives and sharing risk and these results in the choice of a share contract (Otsuka et al. 1992). Thus, the statistical results of land tenancy contracts in study area and evidence from the literature shows that landless laborer in the rural Pakistan as well as in the region were make efficient choices from a wide land tenancy arrangement spectrum, which were ranging from casual and permanent labor employment to long-term tenancy as well as owner cultivation. We considered, that respondents in the selected three villages were make efficient choices among them, because all these contracts arrangements were working under no institutional constraints. On the other hand, the landlord in the study area, who were manage all these contracts arrangements informally, tend to choose those contract in which he has the ability to enforce contractual term and condition. Bell and Zusman (1989) explained, that the principal chooses the contract to offer in full knowledge of the optimizing behavior of the agent, under the constraint that the contract be at least as attractive to the agent as the agent's alternative opportunities for employing his resources. Also in the wide range of agrarians literature sharecropping has been explained as a mechanism for risk sharing and for screening of tenants (Cheung, 1969, Newbery and stiglitz 1979).

Table 2.8 shows the age wise distribution of sample respondents with respect to type of land tenancy contracts in the study area. The table shows that majority of the respondents were in the age group of below 40 years, in both villages and contract wise, also the table shown village wise distribution of respondents from each selected village, which belonging from the same age group. The second dominant group of the respondent was of those which age group was of 60 years and above. The statistics of the study shows that in village Fazle Abad the average age was 52.6 years while maximum age observed was 70 years and minimum age observed was 32 years. In village Kadame the mean age was 43.7 with maximum age of 70 years and minimum age of 24 years. In Kaludher the mean age observed was 60 years while the maximum age was again 70 years with minimum age of 36 years was reported. The table also shows that the majority of respondents followed share contract as well as both share and fixed type of contracts. In the group of share contract, the number of respondents was 17 with different age group as the mean age was 52.2 years, maximum age was 70 years and minimum age was 32 years for respondents with share contracts. On the other side in the group of both share and fixed contracts the total number of respondents were 10 with different age groups but mean age was 43.4, maximum age

was 70 years and minimum age observed was 24 years. A small proportion of the respondents also followed fixed contracts and a few were owner cultivator. The table reveals that in the landlord, tenant relationship in study area majority of the sample respondents were farmers with very few owner cultivator and were involve with many types of land tenancy contracts agreements.

Table 2.9 shows the education status of the respondents with in each selected village and tenancy contracts, with their education year groups, which were ranging from 0 to 10. At the first step, in village wise comparison, the number of respondents in village Kadame, their mean year education was 4.5 and the other two villages with their educational year means was reported as 3.3 and 2.8 respectively, with their same maximum and minimum year of education. In the second step we made comparison on the basis of share and both share and fixed contracts, so the respondents which involved in share contract, their mean years of education was 2.2 and respondents which were involve in multiple contracts, their mean years of education was 5.6. On the other hand, the respondents belong in 0-year education group, they were high in numbers, compared with others education years groups. We observed that in landlord, tenant relationship in research area, the respondents which were involve in multiple type land tenancy contracts, they were more skillful because of his high years of schooling. We also assumed that recently changes in agricultural technologies in the country as well as in developing region, the educated tenants will play important role in the production of high quality agriculture products.

Table 2.10 describes the number of male family labor involved in the four types of tenancy contracts in the selected study area, the first part of table shows the distribution of sample respondents in four different family labor size categories and in second part we made the comparison with types of tenancy contracts, so in the village wise comparison the mean value of Kaludher village was 5.6, and the other two villages was reported 3.9 and 3.2 respectively. On the other hand, male family labor in the multiple contract was high with reported mean value 5.2, which was higher than those of share contract. So in total the average male family labor was 4.1. However, Pant (1983) explained that in a tenancy contract family labor is regarded as a crucial resource, since it is easier to supervise one's own family labor than to supervise hired workers, a tenant may be considered to have labor supervision abilities superior as compared to landlord.

Table 2.11 describes the cross tabulation of current contracts duration on the basis of four different types of land tenancy contracts. In the first stage, we made village wise comparison of the sampled respondents, so in village Kadame, the maximum year 21 of duration of the sampled respondents were high compared to other two selected villages, but their minimum year 4 of duration were same in all selected three villages respectively. Also in the year duration category 6-10 their numbers were high compared with other duration years categories. In the second stage, we made contracts type wise comparison with their contract duration. So we were choose only share contract and both fixed and share tenancy contracts in the selected three villages. So in the comparison, the number of respondents which

involved in share contract, their mean and maximum values were 10.8 and 21, compared with both fixed and share.

Table 2.12 describes the cultivated area in acres, which was used in year 2013 for selected three major crops. First we made analysis of each selected village with their farm size cultivated area, the mean farm size in village Fazle Abad was 6.3 which is less than the mean value of the other two selected villages, their cultivated area in acre were 7.7 and 9.3 as reported from the research area, the variation of farm size in Village Fazle Abad was 2.6, which was less than as compare to other two study villages, there values was 3.9 and 6.6. The farm size minimum values of each selected village were not so high but the maximum farm size 22 in village Kālu Dher was high. In case of tenancy contracts the average farm size in share contract was 6.7, which was less as compare to both fixed and share contract, the average was 10. On the other side, sampled respondents which belongs from farm size category 4-8, they were in majority, compared with other farm size categories. The table also reveal that the cultivated area in the study district either small or medium size, so the majority of the sampled respondents were involve in share tenancy. Also the landlord who's cultivated land area are small and familiar with agriculture technology, market as well, were prefer share contract. But those Landlord were far away from their field or government employee, they give their land on fixed contract in the research area.

Table 2.13 represents the cultivated area in acre of the respondents which involved in both fixed and share contracts. Then we made four different categories of farm size on the basis of their sample differences. We were also make three different assumption of the mixed contract, first, two respondents have the same cultivated area, their mean value was 2.8, maximum and minimum values were 3 and 2.5 acre respectively. In the second assumption there were no such respondents which have greater cultivated area than share contract. Third, the maximum number of respondents has less than cultivated area in acre from share contracts, their mean value was 2.6, Max and Mini values 4 and 1 as reported. In general cultivated area in the study villages were small. However the income status of both landlords and tenants were not so high, also the opportunities to earn income from others sources were very low, specifically in case of tenants. We also heard from the respondents during the field visits that in the mixed contract the land area of the landlords were very small or he involved other activities like governmental job, private business etc. or women oriented land.

Table 2.1 the feature of the present tenancy types and their contractual parameters in the study area

Tenancy type	Land Owner			Tenant		
	Cost	Labor	Yield	Cost	Labor	Yield
Owner cultivator	100 %	100 %	100 %	0 %	0 %	0 %
Fixed-rent contract	0 %	0 %	0 %	100 %	100 %	100 %
Share contract	50 %	0 %	50 %	50 %	100 %	50 %

Source: Base line survey 2014

Table 2.3 the feature of the contract duration in the three selected villages

	Villages				Statistics			
	FAZLEABAD	KADAME	KALUDHER	Total	mean	std	max	min
Classification	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(years)	(years)	(years)	(years)
FAZLE ABAD					10.0	3.0	20	4
KADAME					11.0	5.5	21	4
KALU DHER					9.0	4.5	15	4
Duration 0-5	4	2	3	9	4.6	0.5	5	4
Duration 6-10	3	6	2	11	8.5	1.8	10	6
Duration 11-15	0	3	2	5	15.0	0.0	15	15
Duration 16-	3	2	0	5	19.4	1.7	21	16
Total	10	13	7	30	10.2	5.5	21	4

Source: Base line survey 2014

Table 2.4 the feature of the age of tenants and the contract duration in the three selected villages

	Age (years old)					Statistics			
	-40	41-50	51-60	61-	total	mean	std	max	min
Classification	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(years)	(years)	(years)	(years)
FAZLE ABAD	3	1	3	3	10	52.6	12.7	70	32
KADAME	7	2	2	2	13	43.7	13.9	70	24
KALU DHER	1	2	0	4	7	55.3	12.7	70	36
Duration 0-5	3	3	1	2	9	45.6	13.6	65	24
Duration 6-10	6	2	2	1	11	43.8	11.5	64	33
Duration 11-15	0	0	2	3	5	64.0	5.8	70	55
Duration 16-	2	0	0	3	5	53.8	15.0	70	32
total	11	5	5	9	30	49.4	14.2	70	24

Source: Base line survey 2014

Table 2.5 the feature of the education in years and the contract duration in the three selected villages

	Education (years)					Statistics			
	0	5	8	10	total	mean	std	max	min
classification	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(years)	(years)	(years)	(years)
FAZLE ABAD	6	2	1	1	10	2.8	3.7	10	0
KADAME	6	2	1	4	13	4.5	4.4	10	0
KALU DHER	4	1	1	1	7	3.3	4.0	10	0
Duration 0-5	5	1	2	1	9	3.4	4.0	10	0
Duration 6-10	2	3	1	5	11	6.6	3.7	10	0
Duration 11-15	5	0	0	0	5	0.0	0.0	0	0
Duration 16-	4	1	0	0	5	1.0	2.0	5	0
total	16	5	3	6	30	3.6	4.2	10	0

Source: Base line survey 2014

Table 2.6 the feature of the male family labor and the contract duration in the three selected villages

	Num of Family labors (Male, over 15 years old)					Statistics			
	1	2-4	5-7	8-	total	mean	std	max	min
Classification	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(years)	(years)	(years)	(years)
FAZLE ABAD	1	7	2	0	10	3.2	1.7	7	1
KADAME	1	8	3	1	13	3.9	1.9	8	1
KALU DHER	0	5	0	2	7	5.6	4.6	15	2
Duration 0-5	1	6	1	1	9	4.3	3.9	15	1
Duration 6-10	1	8	2	0	11	3.3	1.2	5	1
Duration 11-15	0	2	1	2	5	6.0	3.0	10	2
Duration 16-	0	4	1	0	5	3.4	1.9	7	2
total	2	20	5	3	30	4.1	2.9	15	1

Source: Base line survey 2014

Table 2.7 the feature of the land use and the contract duration in the three selected villages

	Land use (cultivated area; acre)					Statistics			
	-4	4-8	8-12	12-	total	mean	std	max	min
Classification	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(acre)	(acre)	(acre)	(acre)
FAZLE ABAD	1	7	1	1	10	6.3	2.6	12	2
KADAME	1	7	3	2	13	7.7	3.9	17	3
KALU DHER	1	3	1	2	7	9.3	6.6	22	2.5
Duration 0-5	1	6	1	1	9	7.1	5.5	22	2
Duration 6-10	2	6	3	0	11	6.3	2.5	10	2.5
Duration 11-15	0	2	0	3	5	11.4	5.0	17	5
Duration 16-	0	3	1	1	5	7.7	2.8	12	4
total	3	17	5	5	30	7.6	4.5	22	2

Source: Base line survey 2014

Table 2.8 the feature of the age of respondents and the types of contract in the three selected villages

	Age (years old)					Statistics			
	-40	41-50	51-60	61-	total	mean	std	max	min
Classification	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(years)	(years)	(years)	(years)
FAZLE ABAD	3	1	3	3	10	52.6	12.7	70	32
KADAME	7	2	2	2	13	43.7	13.9	70	24
KALU DHER	1	2	0	4	7	55.3	12.7	70	36
Fixed contract	0	0	1	0	1	60.0	0.0	60	60
Share contract	**5**	**3**	**2**	**7**	17	**52.2**	13.8	70	32
Both F and S	**5**	**2**	**2**	**1**	10	**43.4**	13.5	70	24
Owner cultivation	1	0	0	1	2	50.0	14.0	64	36
total	11	5	5	9	30	49.4	14.2	70	24

Source: Base line survey 2014

Table 2.9 the feature of the education in years and the types of contract in the three selected villages

	Education (years)					Statistics			
	0	5	8	10	total	mean	std	max	min
Classification	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(years)	(years)	(years)	(years)
FAZLE ABAD	6	2	1	1	10	2.8	3.7	10	0
KADAME	6	2	1	4	13	4.5	4.4	10	0
KALU DHER	4	1	1	1	7	3.3	4.0	10	0
Fixed contract	1	0	0	0	1	0.0	0.0	0	0
Share contract	**12**	**2**	**1**	**2**	17	**2.2**	3.7	10	0
Both F and S	**3**	**2**	**2**	**3**	10	**5.6**	4.1	10	0
Owner cultivation	0	1	0	1	2	7.5	2.5	10	5
total	16	5	3	6	30	3.6	4.2	10	0

Source: Base line survey 2014

Table 2.10 the feature of the male family labor and the types of contract in the three selected villages

	Num of Family labors (Male, over 15 years old)					Statistics			
	1	2-4	5-7	8-	total	mean	std	max	min
Classification	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(years)	(years)	(years)	(years)
FAZLE ABAD	1	7	2	0	10	3.2	1.7	7	1
KADAME	1	8	3	1	13	3.9	1.9	8	1
KALU DHER	0	5	0	2	7	5.6	4.6	15	2
Fixed contract	0	1	0	0	1	4.0	0.0	4	4
Share contract	**1**	**12**	**3**	**1**	17	**3.6**	2.1	10	1
Both F and S	**1**	**5**	**2**	**2**	10	**5.2**	3.8	15	1
Owner cultivation	0	2	0	0	2	2.5	0.5	3	2
total	2	20	5	3	30	4.1	2.9	15	1

Source: Base line survey 2014

Table 2.11 the feature of the current contracts duration and the types of contract in the three selected villages

	Duration of the current contract (years)					Statistics			
Classification	0-5 (N of HH)	6-10 (N of HH)	11-15 (N of HH)	16- (N of HH)	total (N of HH)	mean (years)	std (years)	max (years)	min (years)
FAZLE ABAD	4	3	0	3	10	10.0	6.0	20	4
KADAME	2	6	3	2	13	11.0	5.5	21	4
KALU DHER	3	2	2	0	7	9.0	4.5	15	4
Fixed contract	0	1	0	0	1	7.0	0.0	7	7
Share contract	**7**	**3**	**2**	**5**	17	**10.8**	6.5	21	4
Both F and S	**2**	**5**	**3**	**0**	10	**9.6**	4.1	15	4
Owner cultivation	0	2	0	0	2	10.0	0.0	10	10
total	9	11	5	5	30	10.2	5.5	21	4

Source: Base line survey 2014

Table 2.12 the feature of the land use and the types of contract in the three selected villages

	Land use (cultivated area; acre)					Statistics			
	-4	4-8	8-12	12-	total	mean	std	max	min
Classification	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(acre)	(acre)	(acre)	(acre)
FAZLE ABAD	1	7	1	1	10	6.3	2.6	12	2
KADAME	1	7	3	2	13	7.7	3.9	17	3
KALU DHER	1	3	1	2	7	9.3	6.6	22	2.5
Fixed contract	0	1	0	0	1	6.5	0.0	6.5	6.5
Share contract	**1**	**12**	**2**	**2**	17	**6.7**	3.2	16	2
Both F and S	**1**	**3**	**3**	**3**	10	**10.0**	5.7	22	3
Owner cultivation	1	1	0	0	2	4.3	1.8	6	2.5
Total	3	17	5	5	30	7.6	4.5	22	2

Source: Base line survey 2014

Table 2.13 the feature of the land use and the dominant type of contract in the three selected villages

	Land use (cultivated area; both F & S; acre)					Statistics			
	-1	1-2	2-3	3-	total	mean	std	max	min
Classification	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(N of HH)	(acre)	(acre)	(acre)	(acre)
F = S	0	0	1	1	2	2.8	0.3	3	2.5
F > S	0	0	0	0	0	0.0	0.0	0	0
F < S	0	2	2	4	8	2.6	1.0	4	1
total	0	2	3	5	10	2.6	0.9	4	1

Source: Base line survey 2014

Chapter 3 the Analytical Hierarchy Process (AHP)

3.1 Background

The land tenancy arrangements have received considerable attention in the literature over the last several decades. However, there is literally a huge amount of famous researches published works on land tenancy contracts, specifically in Asia. The most leading theme in these writing is a land and labor contracts in agrarian economies ("Theories and Facts" Otsuka et al. 1992), and ("A Theory of Contractual Structure in Agriculture", Eswaran et al, 1985). Also, Herring J. (1983) Land to the tiller; the political economy of agrarian reforms in South Asia.

Most of these studies are discussed, the landlords-tenant's relationship and their contractual parameters but the common conclusion were discussing in short term land tenancy contracts. In our research work in the study area, we discussed the long-term land tenancy and their multiple contracts in the landlord-tenant relationship from the base line survey (2014). The utilization of land natural resources in Pakistan as a whole, and particularly in Khyber Pakhtunkhwa, getting higher attention due to the recently technological changes in agriculture production. The dominant contractual form can vary with the crop, the prevailing technology, and the extent of market development and other characteristics of the economic and social environment (Eswaran et al. 1985).

Thus in the selected research area, land resources are utilized by traditional ways of contracts in the landlord-tenant relationship, which were (share, fixed and owner). However, the land tenancy contract and a labor employment contract are alternative ways of resource endowments in an agrarian economy (Otsuka et al. 1992). The important assumption of this research work, to evaluate a hypothetical situation of each decision maker (landlord and tenant) in these tenancy contracts by applying a multi criteria decision making (MCDM) tool, the Analytical Hierarchy Process (AHP).

However, the evaluation of (AHP) as an instrument or tool applied in property sectors from local and global context (Ezwan, M S, 2011, Srinivasan. 1994, Bender et al. 1997, 2000, Chan, 2002). For the initial agreement between the landlord and tenant, there were essential factors (Criteria) which has great impact on these land tenancy contract (Alternative) towards the signing process. Thus, (AHP) serves the purpose of comparison and finds the important impacting factors of different farming practices (Gopal D. B, 2010). However, the selection of a good landlord for a tenant and a reliable tenant for a landlord play key role in these contracts for successful land management. (ONI, 2010) pointed out in the role of estate surveyors, that a prospective tenant must possess; physical appearance, social status, income, while in some cases such attributes are imposed by the owner.

The implications of theoretical models which are reliable with several stylized facts about land tenancy in developing countries agriculture and landlord-tenant preferences for these contract choices. However, the tenancy contracts tend to be rationed according to the initial endowments of wealth among prospective tenants

(Shetty, 1988), thus most empirical research works discussed the important factors for non-marketed inputs tenant's superior endowments such as, managerial ability, credit, family labor and bullocks or production technology (Reid, 1976, Zusman, 1979, Bliss et al. 1982 and Pant, 1983) for which markets are highly imperfect. On the other hand, the ignorance on the part of landlords about tenant's abilities and assets is quite inappropriate for most rural communities because there is little mobility and information about it is easily available (Eswaran et al. 1985).

Moreover, in the landlord-tenant relationship the personal character of both parties were play effective role in the contracts choice in general and specifically in our study area, so from the landlord side, to helps his tenant in (bad production years) by reducing rent (fixed) and timely division of output in share contract, also solved his family and political issues. However, in response the tenant pays loyal services for his and his family in farm production as well as in political and social activities. According to Otsuka et al (1992), the small community in agrarian economies, social interactions among people are intense, therefore both parties may be discouraged from behaving opportunistically giving the high expected cost of losing reputation by discovery of dishonest behavior.

Also the enduring contractual relationship between the landlord and tenant in a relative closed village society, there are circumstances in which reputation has a significant effect in enforcing the terms of the contract.

However, Bell et al. (1989), pointed out, empirical research, which attempts to identify the factors of contract choice with due consideration of household characteristics is still lacking. In the literature researchers argue, in order for the contract to be perfectly enforceable, its term and conditions must be verifiable not only to the contracting parties but also to a third party (Holmstrom 1983 and Clive Bull, 1987).

Moreover, in the one period contract, the tenant will maximize his utility without regard to the depletion of soil fertility and other damage to the land which will adversely affect its future productivity, thus the tendency is like to be stronger under the fixed-rent contract than the share and fixed wage contracts because the former implies greater returns from the neglect of the land (Otsuka at el. 1992).

3.2 Theoretical Explanation of Landlord Factors in AHP with Transaction cost Phenomena

The table represent the decided factors definition from the view point of landlords during the face to face interview by conducting the AHP survey in the study area.

No.	Factors	Definition
1	Character	The tenant is honest, Hardworking (pay proper and due attention towards Agriculture production), Socially acceptable in a close village Society and utilize his inner potentiality in a sound miner to develop a long-term tenancy and personal relationship with landlord and his family. Such attitudes of tenants in the land tenancy contracts reduces the "monitoring and bargaining cost".
2	Financial Position	Wealth of the tenant such as pay rent in time (fixed). Expenditure on production and their own bullocks or tractor in (50:50) share contract.
3	Men Power	Adult labor male (2-3) of tenant family are more concern for a landlord because most of the farm work is still done by human labor like (plantation, fertilization, spraying, especially in (50:50) share tenancy.
4	Experience	The tenant working experience in field of agriculture (5-10 years), aware from latest technology changes. Such as experience tenants are certain much preference in operational decision, efficient used of land in (share) and taking care of the land quality in (fixed). The phenomena of "transaction monitoring cost".
5	Reference	A person in the same village will play the role of middle-man (facilitator) in the initial signing process in these informal tenancy contracts. The most acceptable person for landlord. Such as to know the landlord and tenant families very well. Such facilitator provides structure to the tenancy contracts, also resolve the initial disputes among the contract parties and help out in all types of present "transaction cost".
6	Distance	The landlords cultivated area close to his home, distance away or very far. Incase very far, in such circumstances they prefer to make fixed rent contract. Which is also the "phenomena of transaction cost"

Source: Author Survey August 2015

However, figure 3.1 showed the selected factors comparison in two steps, first the comparison of factors with each other and their comparison with alternatives. Also show AHP structure of the landlord respondent.

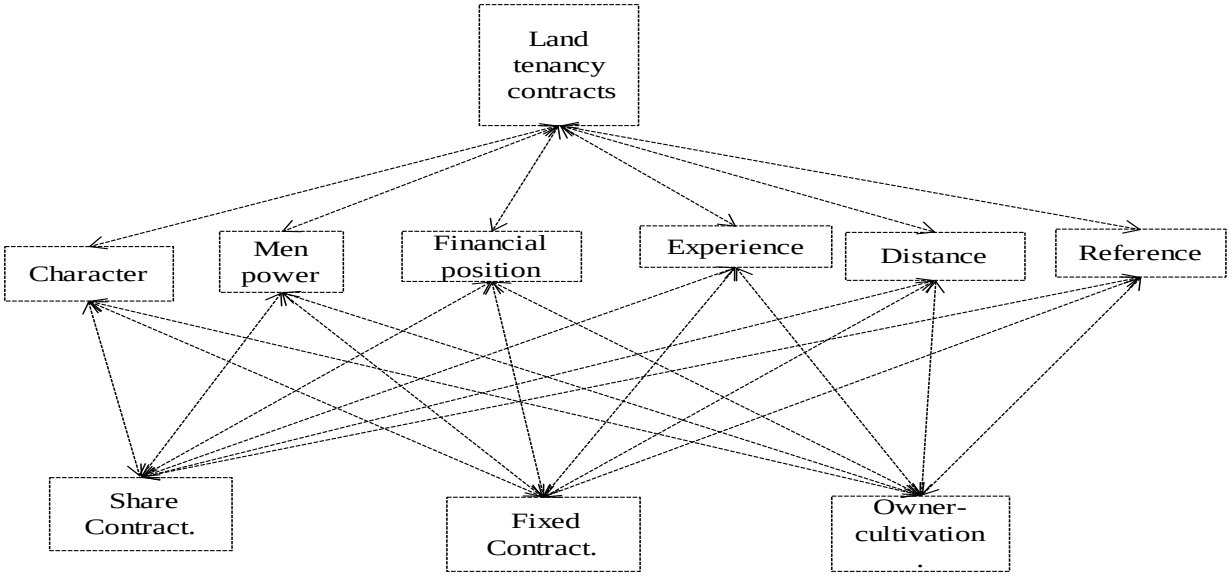


Figure 3.1: A hierarchical representation of the landlord in the land tenancy contract.

Source: Author Survey August 2015

3.3 Theoretical Explanation of important factors of tenants in AHP with Transaction cost Phenomena

The table represent the decided factors definition from the view point of tenants during the face to face interview by conducting the AHP survey in the study area.

No.	Factors	Definition
1	Character	The landlord which has a kind behavior, respect the tenant and his family such as not only support the tenant in farm production but also socially and morally. Equally and timely distribute the crop yield in share tenancy (50:50). Giving such feeling to tenants in land tenure will improve contracts efficiency and reduction in "monitoring and bargaining cost".
2	Financial Position	The landlord to helps his tenant in the marketed inputs such as (fertilizer, hybrid seeds, etc) specially in the peak of crop season (growing or harvesting) in (share) and treat the tenant in a good way in bad agriculture production year in (fixed).
3	Land Condition	Before making the contract, the tenant wants to know the quality of land, either land is irrigated such as (canal or tube-well) irrigation and the fertility of the soil as well in both contracts. Especially in fixed contract the rent per acre depends upon on the quality of landlord available land.
4	House Availability	The tenant preferences the availability of house in the landlord farm specially in share contract, if not available he demands for house before signing the contract. In case of fixed contract, the opportunity is not available for tenant or pay the rent for it.
5	Reference	Actually the condition from a landlord side for his new tenant such as a tenant recently came to the study area.

Source: Author Survey August 2015

However, figure 3.1 showed the selected factors comparison in two steps, first the comparison of factors with each other and their comparison with alternatives. Also show AHP structure of the tenant respondent.

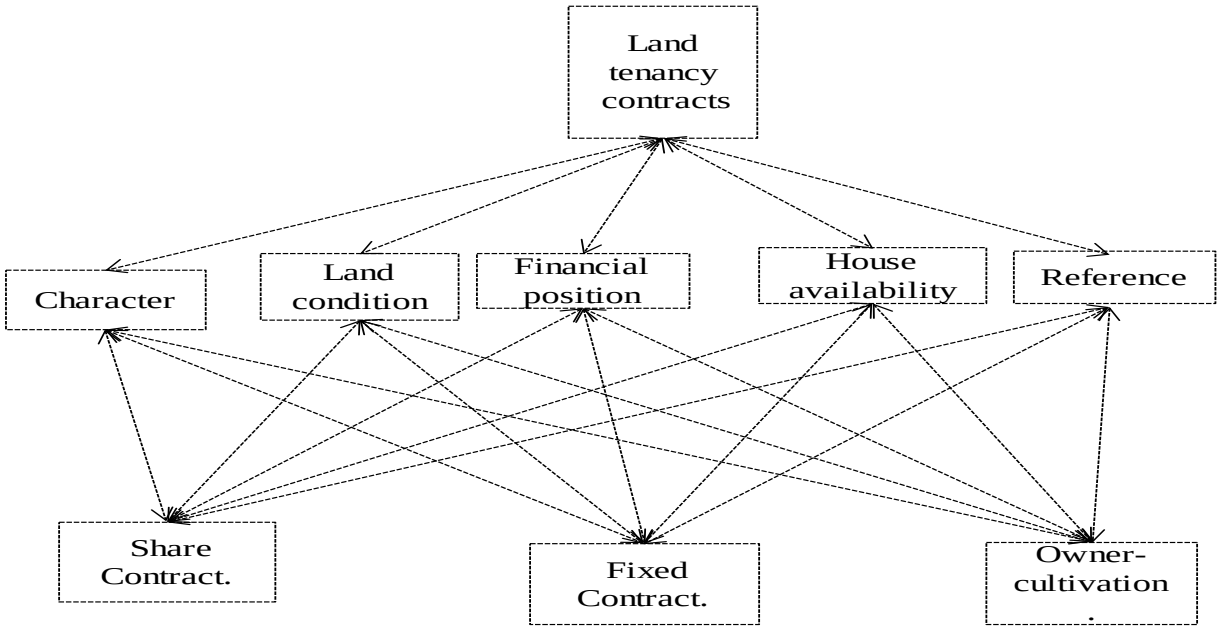


Figure 3.2: A hierarchical representation of the tenant in the land tenancy contract.
Source: Author Survey August 2015

3.4 Objectives of this Study

3.4.1 Objectives

To find out the importance of each type of contract in the landlord-tenant relationship in the study area. Also to check out the important factor, from landlord and tenant point of view in these land tenancy contracts by using AHP.

3.4.2 Hypothetical structure of the study:

A hypothetical situation will be created for the selected respondents (Landlords and Tenants) because they were actually involved in different types of land tenancy contracts. Therefore, the AHP methodology will be adopted to know about the important of each attributes with in the alternative. Then each theoretical judgment of each decision maker will be weight through Tones methods in AHP.

3.4.3 Input matrix structure of the study:

The marked judgments of the decision maker during the survey will be enclosed. Then all data will be put in matrix set for further calculations. This procedure will be adopted for each individual respondent in the selected study area.

Table 3.1 shows factors comparison judgments input matrix of the respondents

	Character	Men power	Experience	Financial position	Reference
Character	1	1	3	⅓	1
Men power	1	1	5	1	3
Experience	⅕	⅕	1	⅕	½
Financial position	3	1	5	1	1
Reference	1	⅓	2	1	1

Source: Author Survey August 2015

3.5 Review about AHP

Alexander (2012), AHP was developed to optimize decision making when one is faced with a mix of qualitative, quantitative and sometimes conflicting factors that are taken into consideration. Thomas L. Saaty (2008), pointed out, the AHP is a theory of measurement through pairwise comparisons and relies on the judgements of experts to derive priority scale.

Bayazit (2005), the approach of the AHP involves the structuring of any complex problem into different hierarchy levels with a view to accomplishing the stated objective of a problem. Chauhan et al (2008), described, the AHP allows better, easier and more efficient identification of selecting criteria, their weighting and analysis. Weinberg (1999), the method permits comparison of alternatives with respect to multiple attributes, particularly useful for complex problems. Sato (2005), pointed out, the AHP has the subjective judgment of each decision-maker as input and the weight of each alternative as output.

Thomas L. Saaty (1990), explained, perhaps the most creative task in making a decision is to choose the factors that are important for that decision.

Table 3.2, from the literature was adopted, which shows the Saaty scale of pair-wise comparison and intensity of importance for each number. These numbers was utilized during the face to face interview of landlords and tenants to weight their decision for each factor.

Johnson (1980), said that (AHP) in solving problem involves four steps. Step 1. Setting up the decision hierarchy by breaking down the decision problem into a hierarchy of interrelated decision elements. Step 2. Collecting input data by pairwise comparisons of decision elements. Step 3. Using the "eigenvalue" method to estimate the relative weights of decision elements, Step 4. Aggregating the relative weights of decision elements to arrive at a set of ratings for the decision alternatives.

Figure 3.3, was implied, which show all the steps involved in AHP methodology and provide information about how to structure the problem.
Source: Zahedi (1986).

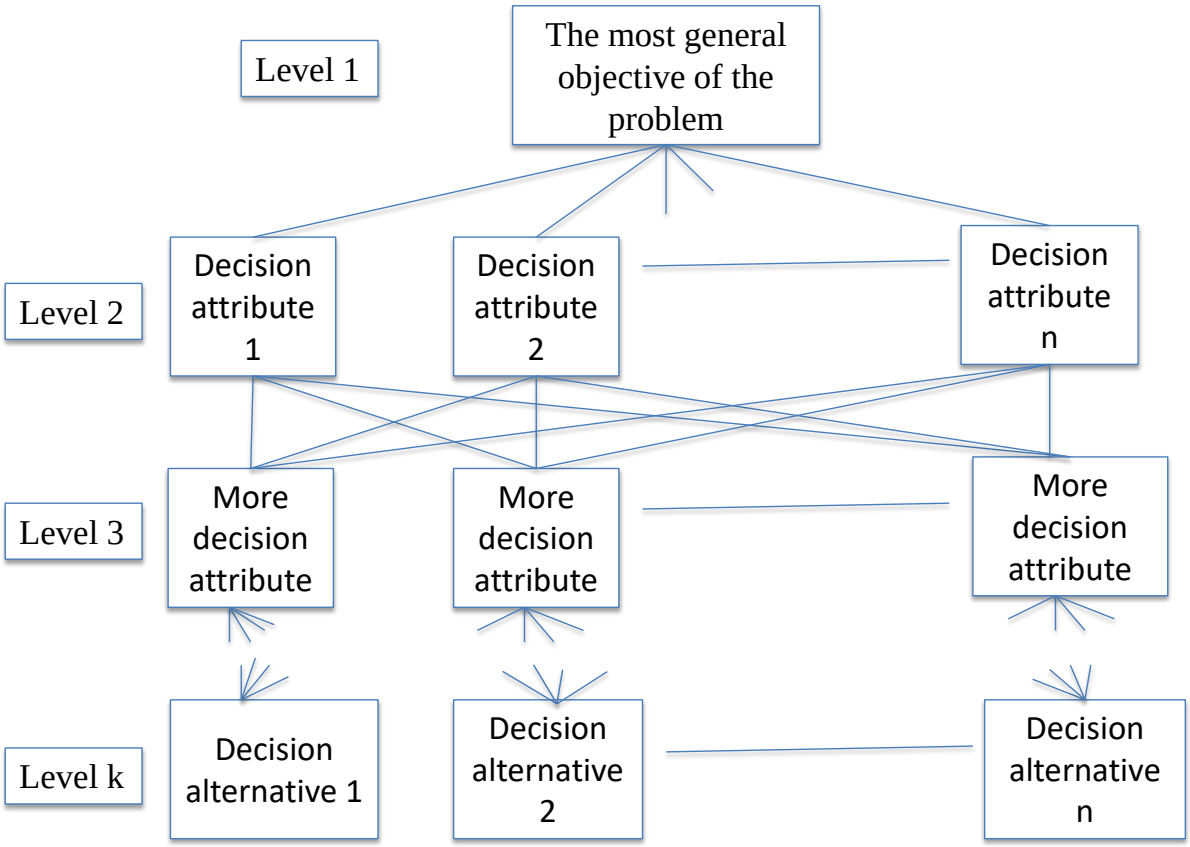


Figure 3.3 the standard form of decision schema in AHP
Source: Zahedi (1986).

Table 3.2 Shows Saaty's scale of pair-wise comparisons

Intensity of importance	Definition	Explanation
1	Equal importance	Two factors contribute equally to the objective
2	Weak or slight	
3	Moderate importance	Experience and judgement slightly favor
4	Moderate plus	
5	Strong importance	Experience and judgement strongly favor
6	Strong plus	
7	Demonstrated importance	Activity is favored very strong over another
8	Very, very strong	
9	Extreme Importance	The evidence favoring one activity over another is of the highest possible order of affirmation
2,4,6,8		Intermediate values when compromise is needed
Reciprocals of above nonzero	If factor i has one of the above non-zero number assigned to it when compared with factor j, then j has the reciprocal value when compared with i	

Source: Thomas L. Saaty, 2008.

3.6 Methods for AHP

3.6.1 Study area

The study area was Khyber Pakhtunkhwa Pakistan, which was selected during the baseline survey in year 2014.

3.6.2 Sampling

In the first step we selected 10 respondents from the base line survey, conducted in (2014), second we were select 6 landlords and 4 tenants meaningfully and not randomly on the bases of their deep local knowledge, educational and farming skills from the different district and villages in the research area. So in the third step we finalized the factors which were important for signing the initial land tenancy contracts process in the study area, from the view point of landlord and tenant. In the final step we made pairwise comparison of all the important factors and then made its comparison with in each alternative by constructing (AHP) model, which was developed by (Saaty, 1980).

Table 3.3, was developed based on the selected respondents to show their selection for AHP survey from each village. Also explain their demographics and actual contract type.

Table 3.3 Sample selection and demographics with basic statistics

Sample selection, Demographics with basic statistics													
	N of HHS			N of LandLord HH (Mean)					N of Tenant HH (Mean)				
Classification				Age	Education	Farm size	Actual contract		Age	Education	Farm size	Actual contract	
Villages	(N of LHH)	N of THH	Total	(years)	(years)	(Acre)	Share	Fixed	(years)	(years)	(Acre)	Share	Fixed
Karnal Sher Killi	2	_	2	48.5	14	17.5	S	_	_	_	_	_	_
Fazle abad	1	2	3	55	16	3	S	_	51.5	7.5	6	S	_
Kaludair	_	1	1	_	_	_	_	_	47	0	5	S	_
kadame	_	1	1	_	_	_	_	_	49	10	7	S	F
Shewa Killi	1	_	1	50	12	35	S	F	_	_	_	_	_
Asfandari	2	_	2	50	12	35	S	F	_	_	_	_	_
Total	6	4	10	50.88	13.5	22.63	S	F	49.17	5.83	6	S	F

Source: Author Survey August 2015

3.6.3 Questionnaire

A comprehensive excel sheet questionnaire was developed to collect the data and information related to the important factors which greatly affect the initial contract process in land tenancy contracts and for making a set of pair-wise comparison in (AHP). Also, a (Saaty), pair-wise comparison scale from 1-9 in (AHP) is applied, to get the data for input matrix and checking out the priority decision weights of landlord and tenant towards each selected factor with in each alternative (Fixed, Share and Owner). Therefore, each (respondent) is interviewed personally at his home/or/field during the field visits to the study area in (2015).

3.6.4 Implementation

The interview schedule was pre-tested in the field accordingly from 13th of August 2015 which was finished in 11th of September 2015. From which we collected information about different factors which were important from both sides. Then analyzed all the decision using Tone's Method in AHP.

3.7 The aggregated formula matrix results discussion of landlords in AHP.

The resulting matrix 3.4 indicates the landlord's pairwise comparisons judgment for each of the alternatives with respect to each criterion. However, we easily capture their demand for nonmarket contractual parameter, when they were making a contract with landless labors in a competitive labor market to utilize their land endowment in study area. Therefore, the weights of the alternative in the resulting set clarify the landlord's judgment preferences for each factors. For example, in case of share contract, the dominant factors weights were character 58.2%, men power 51.6% and experience 48.9% respectively.

However, we observed during the field visits to the research area that the landlords have the full bargaining power in the informal land tenancy contract arrangements to impose clearly contract demands on their counterparts. Therefore, the character of the tenants was more concern in the share contract, especially in (50:50) output ratio, the importance of human labor force was still the main source of agriculture production in the region as whole and particularly in the research province due to the unavailability of latest agriculture technological tools. In the share contract, the landlords were demanding for male labor force of the tenant's family, depends on their cultivated area to perform timely farm related task such as (plantation, irrigation and spraying etc.) for crop production, when they were signing the contract.

However, we observed that the demand for experience and skillful tenants were increase due to the recently development in the hybrid varieties of seeds, intercropping and change in the agriculture market for the high quality products, such as different (vegetable and cash crops). Therefore, the landlords were want to achieve the first best efficiency from their share partner in share contract. On the other hand, the observed weights of financial position, reference and distance was 31.06%, 45%

and 17.82% as reported in the share contract. However, in fixed contracts, the responding resulting weights were in contrast of share contract in the study villages. The reported important weights of criterion were distance 75.1%, financial position 54.08% and reference 49.3% respectively.

In general, we observed from the behavior of the landlords in these study villages that they were mostly concerned with timely payment issues of the tenants and the cultivated area which were far from their home town or absentee landlords they prefer to make a fixed rent contract. Therefore, from the observed weights it's clear that they were not much concern with the other characteristics of the tenant's households. In both contracts the matrix set indicates that reference such as (a third party) play comparatively equal role because without knowing the tenants background the landlords were not making the contracts with them and if any conflict raised in the beginning he was play the role as a facilitator. The other reported weights were character 36.6%, 7.75% men power and experience 9.48% as reported from these villages in case of fixed contract.

In case of owner cultivation, the landlords were managing all the farm task by himself with the help of their own family labor and were hiring the tenants as a causal labor on fixed wage. The data set important weights for owner cultivation of the landlord's judgments were experience 41.3%, men power 40.3% and 11.5% financial position as reported.

Finally, the portions of the landlord's judgments to be allocated to each land tenancy contract are found by determining the product of the factors priorities and the alternative weights as shown below. In the pairwise comparison judgments of the landlords with in the attributes, the important weights were men power 24.8%, reference 24.22%, experience 17.9% and financial position 17.6% respectively. The composite score indicates the final judgments of the landlords for their natural resource utilization through land tenancy contracts. Therefore, 47.8% they were willing to make share contract, 31.6% to made fixed contract and 20.6% to work as owner cultivator.

However, in general in the studies villages, most of the landlords were working in long term informal land tenancy contracts and their dominant contract was share, followed by fixed contract and some were owner cultivator (base line survey 2014). So the AHP results in hypothetical situation proved the landlord's preferences for each criterion with in the alternative for their new tenants before signing the contracts with them and showed their importance weights for each decision in the pairwise comparison.

3.8 The factors comparison results of landlords in AHP with critical indices.

Table 3.5 show the factors comparison input matrices, priority weights, principle Eigen value and consistence indices of the 6 landlords household judgments. In case of L1 in the factor comparison the dominant priority weights was 30.2% financial-position, 29.8% men-power, followed by character 17.5%, reference 16.4% and less important is experience 6.1% as reported from the study villages. On the other hand, the leading priority weights for L2 was experience 25.3%. The equally important decision weights were factor character and reference 22.9%, other weights are 20.4% men-power, 8.5% financial-position respectively. In case of L4, the dominants factors judgments were experience 30.1%, men-power 26%and reference 24.9%. The least weights was 8% financial-position and 11% character as reported. For L3, the heavy weights was men-power 50.5% and financial-position 28.8%. However, in case of L5 the dominant priority weights were reference 43.3%, men-power 23.8, followed by experience 16.9% and character 16.1% respectively reported from the study District. For L6, the priority weights of selected factors were, reference 35%, financial-position 29.2 and experience 23.5% respectively.

In the overall factors comparison of the landlords respondents it was found, that the factors men-power and reference is the most dominant priority weights. The table also showed the consistency ratio of the landlord's decision in the criterion comparison through which their decision were consistent on different level, 2.3%, 6%, 7.1%, 7.3%, 7.7% and 9.8% as reported from the study villages.

3.9 The individual landlord factors evaluation within land tenancy contracts.

In this section of the results and discussion we were represents the 6 landlords decision making behavior for the each selected criterion comparison with in the land tenancy contracts (share, fixed, owner cultivation). Also showed their input matrices with priority weights and consistency of the judgments.

Landlord 1: Table 3.6 showed evaluation for his selected factors within the alternative. In case of share contract the dominant priority criterions were character 58.2%, experience 51.5% and men-power 48.7%, in addition the factor financial-position 48.1%, 36.7% character were leading in fixed-rent contract. However the factor reference 47.4% was equally important in both cases for making the new contract with tenant. In case of owner-cultivation the dominant weight factors were men-power 43.5% and 38.8% experience to utilize his land endowment. The consistency ratio for each criterions within the alternative were 4.6%, 1.1%, 6.9%, 2.5% and 0% as reported from the L1 decisions in AHP.

Landlord 2: The resulting table 3.7 presented assessment in selected criterions within the land tenancy arrangement for his land resources. In case of share contract the dominant priority factors weight were character 58.2%, men-power 48.7% and

experience 45.2% respectively. For fixed contract the factors financial-position 48.7%, 36.7% character were dominant priorities. In addition, the factor reference 47.4% was equally important in both contracts for making the new contract with tenant. In case of owner-cultivation the dominant weight factors were 47.6% experience and men-power 43.5% respectively. The decision consistency ratio of L2 in AHP analysis for each criterions within alternative were 4.6%, 1.1%, 1.1%, 0.2% and 0% as reported.

Landlord 3: The table 3.8 indicated results of important factors within the alternative. In case of fixed contract the dominant priority factors weight were distance 75.1%, financial-position 73.1% and reference 58.2%. For share contract the factors men-power 48.7%, 36.7% reference were dominant priorities. However, the factor men-power 43.5% was the only important priority in case of owner-cultivation. The decision consistency ratio of L3 in AHP analysis for each criterions within alternative were 1.1%, 4.6%, 5.6% and 2.5% as reported.

Landlord 4: Table 3.9 showed evaluation for his selected factors within the alternative. In case of share and fixed-rent contract the criterion character and reference 47.4% were equally important in the comparison. In case of self-cultivation the dominant priority factors weight were men-power 43.5% and 43.5% experience respectively. For share contract the important weights were men-power 48.7%, Experience 48.7% and financial-position 38.7% when making the initial contract with new tenant. In case of fixed financial-position 44.3% was the dominant weight. The consistency ratio for each criterions within the alternative were 0.0%, 1.6%, 1.1%, 1.1% and 0% as reported from the L4 decisions in the comparison in AHP.

Landlord 5: The table 3.10 indicated results of important factors within the land tenancy contracts. In case of share contract the dominant priority factors weight were character 58.2%, men-power 57.4% and experience 48.7%. For fixed contract the factors reference 47.4%, 36.7% character were dominant priorities. However, the factors experience 43.5% and men-power 36.1% were the important priority in case of owner-cultivation. The decision consistency ratio of L5 in AHP analysis for each criterions within alternative were 4.6%, 4.6%, 0% and 1.1% as reported.

Landlord 6: The table 3.11 indicated results of important factors within the land tenancy contracts. In case of share contract the dominant priority factors weight were men-power 64.9% and experience 48.1%. For fixed contract the factors financial-position 61%. The factor reference 47.4% was equally important in both cases. 36.7% character were dominant priorities. However, the factors experience 40.5% and men-power 27.9% were the leading priority in case of owner-cultivation. The decision consistency ratio of L6 in AHP analysis for each criterions within alternative were 5.6%, 8.1%, 0% and 2.5% as reported.

4.10 The aggregated matrix formula results discussion of tenants in AHP.

The resulting matrix 3.12 of the tenant's respondents showed the importance weights with in the alternative. Therefore, in case of share contract the dominant criterion weights were, house availability 68.8%, financial position 67.3% and character 64.2% reported from the study villages, when tenants were entering to the share tenancy arrangements with landlords. However, from the discussion of long term tenancy contract duration (author 2014), we saw that most of sharecroppers lived in the country as whole and specifically in the research area, houses developed by their landlords.

Actually one of the priority demand of the tenants during the initial contract signing process, when they were entering in share tenancy relationship such as (50:50) ratio, with their landlords, because, their economical position was not very strong, compared with those tenants which were working in fixed rent tenancy. In case of financial position of the landlords for the tenants in share contract in the research area were important in many ways, like some time a sharecropper need advanced money for their family oriented issues such as (death, Marriages etc) circumstances, so first they want to borrowed money from their own landlords and some time they need credit for Agriculture marketed inputs, such as (fertilizer, weedicide and pesticide) to purchase.

On the other hand, the less important factors judgments weights in share contract were, 47.3% reference and 36.6% land condition as reported. In case of fixed contract in the resulting set for the tenants when they were making the initial contract settlement with their landlords, the important priority weights were, land condition 58.2% and reference 47.37% respectively.

However, due to the contract norms and condition in the study area, the landlords were not bounded to provide any assistance to his lease and the tenants were only thinking about the landlords cultivated land condition such as (soil fertility, irrigated or unirrigated etc) collect all this information before signing the contract and pay rents in accordance such as (advance or after the harvest of cash crop). The reference role was more important in both cases, actually a condition from the landlord's side in general in the study villages, also we heard during the field visits that was not the tenant's preferences in the initial land tenancy arrangements but the demand of their opponents.

Therefore, the other priority weights in fixed contract were, 28.4% character, 23.6% financial position of the landlords and house availability 22.9% as reported from the studies villages. We were neglecting the discussion related to owner cultivation because the tenants were no concern with the landlords but if tenants want, they only work with a landlord as casual labor or permanent labor.

However, the AHP resulting matrix set identified judgments weights of each criterion with in each alternative of the tenant's respondents, the weights showed their choices for each tenancy contracts before starting the contracts with their landlords. Finally, the proportions of the tenant's decisions to be apportioned to each land

tenancy contract are instituted by determining the product of the attributes and the alternative weights as shown below.

In the pairwise comparison decisions of the tenants with in the factors, the important weights were land condition 39.6%, reference 11.1%, house availability 22.2% and character 11.8% respectively. However, the combined score indicates the final judgments of the tenants for their human resource deployment through land tenancy contracts. However, 51.7% they were preferring to make share contract, 41.7% to made fixed contract and 6.2% to work as causal labor in the selected studies villages.

3.11 The individual matrix formula results of tenants in AHP.

In this section of the results and discussion we were represents the 4 tenant's decision making behavior for the each selected criterion comparison with in the land tenancy contracts (share, fixed, owner cultivation) through matrix formulation.

Tenant 1: the resulting matrix 3.13 showed the importance weights with in the alternative. Therefore, in case of share contract the dominant criterion weights were, character 67.1%, house-availability 64.9% and financial-position 57.3%, when he entering to the share tenancy arrangement with landlord. In case of fixed contract, the important priority weights was land condition 58.2%. The factor reference 47.37% was equally important in both contracts. In case of owner-cultivation he work as labor. In the pairwise comparison decisions, the dominant weights were land condition 36.4%, house availability 30.1% and financial-position 21.5% respectively. However, the combined score indicates the final judgments of T1 human resource deployment through land tenancy contracts. Though, 52.27% T1 preferring to make share contract, 41.6% to made fixed contract and 6.1% to work as causal labor in the selected studies area.

Tenant 2: the resulting matrix set 3.14 indicate the importance weights with in the land tenancy. However, in case of share contract the dominant criterion weights were, character 66.9%, house-availability 73.06% and financial-position 73.06%. In case of fixed contract, the important priority weights was land condition 58.2%. The factor reference 47.37% was equally important in both contracts. In case of owner-cultivation nothing important. In the pairwise comparison decisions, the dominant weights were character 31.1%, land condition 24%, house availability 18.4% and reference 22.4% as reported. However, the combined score indicates the final judgments of T2 human resource arrangement through land tenancy contracts. Therefore, 56.6% T2 desiring to make share contract, 36.39% fixed contract and 6.9% to work as causal labor.

Tenant 3: the resulting matrix set 3.15 indicate the importance weights with in the land tenancy. However, in case of share contract the dominant criterion weights were, character 64.9%, house-availability 64.9% and financial-position 66.9%. In case of fixed contract, the priority weights were land condition 58.2%, house-availability

and character 27.9% equally important. In case of owner-cultivation nothing important. In the pairwise comparison, the dominant weights were land condition 52.1% and house-availability 34.3% respectively. However, the combined score indicates the final judgments of T3 human resource deployment through land tenancy contracts. Therefore, 50.3% T3 wishing to make share contract, 43.4% fixed contract and 6.2% to work as causal labor.

Tenant 4: the resulting matrix 3.16 showed the importance weights with in the alternative. Therefore, in case of share contract the dominant criterion weights were, character 58.2%, house-availability 73.06% and financial-position 73.06%, when he entering to the share tenancy arrangement with landlord. In case of fixed contract, the important priority weights was land condition 58.2% and character 36.6%. The factor reference 47.37% was equally important in both contracts. In case of owner-cultivation he work as labor. In the pairwise comparison decisions, the dominant weights were land condition 54%, house availability 12.9% and character 13.5% respectively. However, the combined score indicates the final judgments of T4 human resource deployment through land tenancy contracts. Therefore, 48.2% T4 preferring to make share contract, 45.9% to made fixed contract and 5.5% to work as causal labor in the selected studies area.

Table 3.4 the AHP aggregated result of Landlords

$$\begin{bmatrix} \text{Character} \\ \text{Men power} \\ \text{Experiences} \\ \text{Financial position} \\ \text{Reference} \\ \text{Distance} \end{bmatrix} = \begin{matrix} \text{Share contract} \\ \begin{bmatrix} 0.5820 \\ 0.5169 \\ 0.4898 \\ 0.3106 \\ 0.4500 \\ 0.1782 \end{bmatrix} \end{matrix} \quad \begin{matrix} \text{Fixed contract} \\ \begin{bmatrix} 0.3667 \\ 0.0775 \\ 0.0948 \\ 0.5408 \\ 0.4936 \\ 0.7514 \end{bmatrix} \end{matrix} \quad \begin{matrix} \text{Owner cultivation} \\ \begin{bmatrix} 0.0513 \\ 0.4036 \\ 0.4134 \\ 0.1150 \\ 0.0524 \\ 0.0704 \end{bmatrix} \end{matrix}$$

$$\begin{bmatrix} \text{Share contract} \\ \text{Fixed contract} \\ \text{Owner cultivation} \end{bmatrix} = 0.1631 \times \overset{\text{Character}}{\begin{bmatrix} 0.5820 \\ 0.3667 \\ 0.0513 \end{bmatrix}} + 0.2482 \times \overset{\text{Men power}}{\begin{bmatrix} 0.5169 \\ 0.0751 \\ 0.4036 \end{bmatrix}} + 0.1790 \times \overset{\text{Experience}}{\begin{bmatrix} 0.4898 \\ 0.0948 \\ 0.4134 \end{bmatrix}}$$

$$+ 0.1768 \times \overset{\text{Financial position}}{\begin{bmatrix} 0.3106 \\ 0.5408 \\ 0.1150 \end{bmatrix}} + 0.0645 \times \overset{\text{Distance}}{\begin{bmatrix} 0.1782 \\ 0.7514 \\ 0.0704 \end{bmatrix}} + 0.2422 \times \overset{\text{Reference}}{\begin{bmatrix} 0.4500 \\ 0.4936 \\ 0.0524 \end{bmatrix}} = \overset{\text{Overall}}{\begin{bmatrix} 0.4571 \\ 0.3099 \\ 0.2234 \end{bmatrix}}.$$

Source: Author Survey August 2015

Table 3.5 represents the AHP input matrixes, Priority weights, Principle Eigen values, Consistency index, Random index and Consistency ratio of the landlords

The 6 Landlord AHP results										
Factors preriority weigths and consistency indices of L1										
Criteria	C	M	E	F	R	Priority	Lamdamax	C.I.	R.I.	C.R.
Character	1.000	1.000	3.000	0.333	1.000	0.175	5.268	0.067	1.120	0.060
Men-power	1.000	1.000	5.000	1.000	3.000	0.298				
Experience	0.333	0.200	1.000	0.200	0.500	0.061				
Financial. P	3.000	1.000	5.000	1.000	1.000	0.302				
Reference	1.000	0.333	2.000	1.000	1.000	0.164				
Sum	6.333	3.533	16.000	3.533	6.500					
Factors preriority weigths and consistency indices of L2										
Criteria	C	M	F	E	R	Priority	Lamdamax	C.I.	R.I.	C.R.
Character	1.000	1.000	3.000	1.000	1.000	0.229	5.102	0.026	1.120	0.023
Men-power	1.000	1.000	3.000	0.500	1.000	0.204				
Financial. P	0.333	0.333	1.000	0.500	0.333	0.085				
Experience	1.000	2.000	2.000	1.000	1.000	0.253				
Reference	1.000	1.000	3.000	1.000	1.000	0.229				
Sum	4.333	5.333	12.000	4.000	4.333					
Factors preriority weigths and consistency indices of L4										
Criteria	C	F	M	E	R	Priority	Lamdamax	C.I.	R.I.	C.R.
Character	1.000	1.000	0.333	0.200	1.000	0.110	5.317	0.079	1.120	0.071
Financial. P	1.000	1.000	0.333	0.333	0.200	0.080				
Men-power	3.000	3.000	1.000	1.000	1.000	0.260				
Experience	5.000	3.000	1.000	1.000	1.000	0.301				
Reference	1.000	5.000	1.000	1.000	1.000	0.249				
Sum	11.000	13.000	3.667	3.533	4.200					
Factors preriority weigths and consistency indices of L3										
Criteria	M	R	F	D	Priority	Lamdamax	C.I.	R.I.	C.R.	
Men-power	1.000	3.000	3.000	5.000	0.505	4.198	0.066	0.900	0.073	
Reference	0.333	1.000	0.333	3.000	0.143					
Finance	0.333	3.000	1.000	5.000	0.288					
Distance	0.200	0.333	0.200	1.000	0.064					
Sum	1.867	7.333	4.533	14.000						
Factors preriority weigths and consistency indices of L5										
Criteria	E	C	M	R	Priority	Lamdamax	C.I.	R.I.	C.R.	
Experience	1.000	1.000	1.000	0.333	0.169	4.207	0.069	0.900	0.077	
Character	1.000	1.000	1.000	0.250	0.161					
Men-powr	1.000	1.000	1.000	1.000	0.238					
Reference	3.000	4.000	1.000	1.000	0.433					
Sum	6.000	7.000	4.000	2.583						
Factors preriority weigths and consistency indices of L6										
Criteria	M	R	F	D	Priority	Lamdamax	C.I.	R.I.	C.R.	
Men-power	1.000	1.000	0.333	0.200	0.123	4.264	0.088	0.900	0.098	
Experience	1.000	1.000	1.000	1.000	0.235					
Finance	3.000	1.000	1.000	1.000	0.292					
Reference	5.000	1.000	1.000	1.000	0.350					
Sum	10.000	4.000	3.333	3.200						

Source: Author Survey August 2015

Table 3.6 show each factor evaluation with in alternative for landlord 1

lanlord 1								
AHP for F1 (character)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	2.000	9.000	0.582	3.054	0.027	0.580	0.046
Fixed	0.500	1.000	9.000	0.367				
Owner	0.111	0.111	1.000	0.051				
Sum	1.611	3.111	19.000					
AHP for F2 (Men power)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	7.000	1.000	0.487	3.013	0.006	0.580	0.011
Fixed	0.143	1.000	0.200	0.078				
Owner	1.000	5.000	1.000	0.435				
Sum	2.143	13.000	2.200					
AHP for F3 (Experience)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	7.000	1.000	0.515	3.080	0.040	0.580	0.069
Fixed	0.143	1.000	0.333	0.097				
Owner	1.000	3.000	1.000	0.388				
Sum	2.143	11.000	2.333					
AHP for F4 (Financial position)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	1.000	3.000	0.405	2.826	0.015	0.580	0.025
Fixed	0.500	1.000	5.000	0.481				
Owner	0.333	0.200	1.000	0.114				
Sum	1.833	2.200	9.000					
AHP for F5 (Reference)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	1.000	9.000	0.474	3.000	0.000	0.580	0.000
Fixed	1.000	1.000	9.000	0.474				
Owner	0.111	0.111	1.000	0.053				
Sum	2.111	2.111	19.000					

Source: Author Survey August 2015

Table 3.7 show each factor evaluation with in alternative for landlord 2

Landlord 2								
AHP for F1 (character)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	2.000	9.000	0.582	3.054	0.027	0.580	0.046
Fixed	0.500	1.000	9.000	0.367				
Owner	0.111	0.111	1.000	0.051				
Sum	1.611	3.111	19.000					
AHP for F2 (Men power)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	7.000	1.000	0.487	3.013	0.006	0.580	0.011
Fixed	0.143	1.000	0.200	0.078				
Owner	1.000	5.000	1.000	0.435				
Sum	2.14286	13	2.2					
AHP for F3 (Financial position)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	1.000	5.000	0.435	3.013	0.006	0.580	0.011
Fixed	1.000	1.000	7.000	0.487				
Owner	0.200	0.143	1.000	0.078				
Sum	2.200	2.143	13.000					
AHP for F4 (Experience)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	6.000	1.000	0.452	3.003	0.001	0.580	0.002
Fixed	0.167	1.000	0.143	0.072				
Owner	1.000	7.000	1.000	0.476				
Sum	2.167	14.000	2.143					
AHP for F5 (Reference)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	1.000	9.000	0.474	3.000	0.000	0.580	0.000
Fixed	1.000	1.000	9.000	0.474				
Owner	0.111	0.111	1.000	0.053				
Sum	2.111	2.111	19.000					

Source: Author Survey August 2015

Table 3.8 show each factor evaluation with in alternative for landlord 3

Lanlord 3

AHP for F3 (Men power)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	7.000	1.000	0.487	3.013	0.006	0.580	0.011
Fixed	0.143	1.000	0.200	0.078				
Owner	1.000	5.000	1.000	0.435				
Sum	2.142857	13	2.2					
AHP for F4 (reference)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	0.500	9.000	0.367	3.054	0.027	0.580	0.046
Fixed	2.000	1.000	9.000	0.582				
Owner	0.111	0.111	1.000	0.051				
Sum	3.111	1.611	19.000					
AHP for F2 (Financial position)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	0.200	3.000	0.188	3.065	0.032	0.580	0.056
Fixed	5.000	1.000	7.000	0.731				
Owner	0.333	0.143	1.000	0.081				
Sum	6.333	1.343	11.000					
AHP for F1 (distance)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	0.200	3.000	0.178	3.029	0.015	0.580	0.025
Fixed	5.000	1.000	9.000	0.751				
Owner	0.333	0.111	1.000	0.070				
Sum	6.333	1.311	13.000					

Source: Author Survey August 2015

Table 3.9 show each factor evaluation with in alternative for landlord 4

Landlord 4

AHP for F1 (character)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	1.000	9.000	0.474	3.000	0.000	0.580	0.000
Fixed	1.000	1.000	9.000	0.474				
Owner	0.111	0.111	1.000	0.053				
Sum	2.111	2.111	19.000					
AHP for F2 (Financial position)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	1.000	2.000	0.387	3.018	0.009	0.580	0.016
Fixed	1.000	1.000	3.000	0.443				
Owner	0.500	0.333	1.000	0.169				
Sum	2.500	2.333	6.000					
AHP for F3 (Men power)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	7.000	1.000	0.487	3.013	0.006	0.580	0.011
Fixed	0.143	1.000	0.200	0.078				
Owner	1.000	5.000	1.000	0.435				
Sum	2.143	13.000	2.200					
AHP for F4 (Experience)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	7.000	1.000	0.487	3.013	0.006	0.580	0.011
Fixed	0.143	1.000	0.200	0.078				
Owner	1.000	5.000	1.000	0.435				
Sum	2.143	13.000	2.200					
AHP for F5 (Reference)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	1.000	9.000	0.474	3.000	0.000	0.580	0.000
Fixed	1.000	1.000	9.000	0.474				
Owner	0.111	0.111	1.000	0.053				
Sum	2.111	2.111	19.000					

Source: Author Survey August 2015

Table 3.10 show each factor evaluation with in alternative for landlord 5

lanlord 5

AHP for F3 (Men power)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	7.000	2.000	0.574	3.054	0.027	0.580	0.046
Fixed	0.143	1.000	0.143	0.065				
Owner	0.500	7.000	1.000	0.361				
Sum	1.643	15.000	3.143					
AHP for F4 (character)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	2.000	9.000	0.582	3.054	0.027	0.580	0.046
Fixed	0.500	1.000	9.000	0.367				
Owner	0.111	0.111	1.000	0.051				
Sum	1.611	3.111	19.000					
AHP for F2 (reference)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	1.000	9.000	0.474	3	0	0.58	0
Fixed	1.000	1.000	9.000	0.474				
Owner	0.111	0.111	1.000	0.053				
Sum	2.111	2.111	19.000					
AHP for F1 (experience)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	7.000	1.000	0.487	3.013	0.006	0.580	0.011
Fixed	0.143	1.000	0.200	0.078				
Owner	1.000	5.000	1.000	0.435				
Sum	2.143	13.000	2.200					

Source: Author Survey August 2015

Table 3.11 show each factor evaluation with in alternative for landlord 6

landlord 6

AHP for F1 (Men power)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	7.000	3.000	0.649	3.065	0.032	0.580	0.056
Fixed	0.143	1.000	0.200	0.072				
Owner	0.333	5.000	1.000	0.279				
Sum	1.476	13.000	4.200					
AHP for F3 (finance)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	0.500	1.000	0.225	3.094	0.047	0.580	0.081
Fixed	2.000	1.000	5.000	0.610				
Owner	1.000	0.200	1.000	0.166				
Sum	4.000	1.700	7.000					
AHP for F4 (reference)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	1.000	9.000	0.474	3.000	0.000	0.580	0.000
Fixed	1.000	1.000	9.000	0.474				
Owner	0.111	0.111	1.000	0.053				
Sum	2.111	2.111	19.000					
AHP for F2 (experience)								
Alternative	S.	F.	O.	Priority	Lamdamax	CI	RI	CR
Share	1.000	5.000	1.000	0.481	3.029	0.015	0.580	0.025
Fixed	0.200	1.000	0.333	0.114				
Owner	1.000	3.000	1.000	0.405				
Sum	2.200	9.000	2.333					

Source: Author Survey August 2015

Table 3.12 the AHP aggregated results of Tenants

$$\begin{bmatrix} \text{Character} \\ \text{Land condition} \\ \text{House availability} \\ \text{Financial position} \\ \text{References} \end{bmatrix} = \begin{bmatrix} \overset{\text{Share contract}}{0.6420} & \overset{\text{Fixed contract}}{0.2849} & \overset{\text{Owner cultivation}}{0.0672} \\ 0.3667 & 0.5820 & 0.0513 \\ 0.6887 & 0.2292 & 0.0763 \\ 0.6729 & 0.2362 & 0.0783 \\ 0.4737 & 0.4737 & 0.0526 \end{bmatrix}$$

$$\begin{bmatrix} \text{Share contract} \\ \text{Fixed contract} \\ \text{Owner cultivation} \end{bmatrix} = 0.1183 \times \overset{\text{Character}}{\begin{bmatrix} 0.6420 \\ 0.2849 \\ 0.0672 \end{bmatrix}} + 0.3961 \times \overset{\text{Land condition}}{\begin{bmatrix} 0.3667 \\ 0.5820 \\ 0.0513 \end{bmatrix}} + 0.2229 \times \overset{\text{House availability}}{\begin{bmatrix} 0.6887 \\ 0.2292 \\ 0.0763 \end{bmatrix}}$$

$$+ 0.0804 \times \overset{\text{Financial position}}{\begin{bmatrix} 0.6729 \\ 0.2362 \\ 0.0783 \end{bmatrix}} + 0.1113 \times \overset{\text{Reference}}{\begin{bmatrix} 0.4737 \\ 0.4737 \\ 0.0526 \end{bmatrix}} = \overset{\text{Overall}}{\begin{bmatrix} 0.5178 \\ 0.4170 \\ 0.0625 \end{bmatrix}}.$$

Source: Author Survey August 2015

Table 3.13 shows the matrix formula AHP results of tenant 1

	Share contract	Fixed contract	Owner cultivation
Character	0.6716	0.2654	0.0629
Land condition	0.3667	0.5820	0.0513
House availability	0.6491	0.2790	0.0719
Financial position	0.5736	0.3614	0.0650
References	0.4737	0.4737	0.0526

$$\begin{bmatrix} \text{Share contract} \\ \text{Fixed contract} \\ \text{Owner cultivation} \end{bmatrix} = 0.0687 \times \overset{\text{Character}}{\begin{bmatrix} 0.6716 \\ 0.2654 \\ 0.0629 \end{bmatrix}} + 0.3640 \times \overset{\text{Land condition}}{\begin{bmatrix} 0.3667 \\ 0.5820 \\ 0.0513 \end{bmatrix}} + 0.3011 \times \overset{\text{House availability}}{\begin{bmatrix} 0.6491 \\ 0.2790 \\ 0.0719 \end{bmatrix}}$$

$$+ 0.2155 \times \overset{\text{Financial position}}{\begin{bmatrix} 0.5736 \\ 0.3614 \\ 0.0650 \end{bmatrix}} + 0.1637 \times \overset{\text{Reference}}{\begin{bmatrix} 0.4737 \\ 0.4737 \\ 0.0526 \end{bmatrix}} = \overset{\text{Overall}}{\begin{bmatrix} 0.5227 \\ 0.4160 \\ 0.0613 \end{bmatrix}}.$$

Source: Author Survey August 2015

Table 3.14 shows the matrix formula AHP results of tenant 2

	Share contract	Fixed contract	Owner cultivation
Character	0.6694	0.2426	0.0879
Land condition	0.3667	0.5820	0.0513
House availability	0.7306	0.1884	0.0810
Financial position	0.7306	0.1884	0.0810
References	0.4737	0.4737	0.0526

$$\begin{bmatrix}\text{Share contract}\\ \text{Fixed contract}\\ \text{Owner cultivation}\end{bmatrix} = 0.3118 \times \overset{\text{Character}}{\begin{bmatrix}0.6694\\0.2426\\0.0879\end{bmatrix}} + 0.2400 \times \overset{\text{Land condition}}{\begin{bmatrix}0.3667\\0.5820\\0.0513\end{bmatrix}} + 0.1844 \times \overset{\text{House availability}}{\begin{bmatrix}0.7306\\0.1884\\0.0810\end{bmatrix}}$$

$$+ 0.0388 \times \overset{\text{Financial position}}{\begin{bmatrix}0.7306\\0.1884\\0.0810\end{bmatrix}} + 0.2249 \times \overset{\text{Reference}}{\begin{bmatrix}0.4737\\0.4737\\0.0526\end{bmatrix}} = \overset{\text{Overall}}{\begin{bmatrix}0.5664\\0.3639\\0.0697\end{bmatrix}}.$$

Source: Author Survey August 2015

Table 3.15 shows the matrix formula AHP results of tenant 3

	Share contract	Fixed contract	Owner cultivation
Character	0.6491	0.2790	0.0719
Land condition	0.3667	0.5820	0.0513
House availability	0.6491	0.2790	0.0719
Financial position	0.6694	0.2426	0.0879

$$\begin{bmatrix} \text{Share contract} \\ \text{Fixed contract} \\ \text{Owner cultivation} \end{bmatrix} = 0.0676 \times \overset{\text{Character}}{\begin{bmatrix} 0.6491 \\ 0.2790 \\ 0.0719 \end{bmatrix}} + 0.5218 \times \overset{\text{Landcondition}}{\begin{bmatrix} 0.3667 \\ 0.5820 \\ 0.0513 \end{bmatrix}} + 0.3430 \times \overset{\text{House availability}}{\begin{bmatrix} 0.6491 \\ 0.2790 \\ 0.0719 \end{bmatrix}} +$$

$$0.0676 \times \overset{\text{Financial position}}{\begin{bmatrix} 0.6694 \\ 0.2426 \\ 0.0879 \end{bmatrix}} = \overset{\text{Overall}}{\begin{bmatrix} 0.5031 \\ 0.4346 \\ 0.0623 \end{bmatrix}}.$$

Source: Author Survey August 2015

Table 3.16 shows the matrix formula AHP results of tenant 4

	Share contract	Fixed contract	Owner cultivation
Character	0.5820	0.3667	0.0513
Land condition	0.3667	0.5820	0.0513
House availability	0.7306	0.1884	0.0810
Financial position	0.7306	0.1884	0.0810
References	0.4737	0.4737	0.0526

$$\begin{bmatrix} \text{Share contract} \\ \text{Fixed contract} \\ \text{Owner cultivation} \end{bmatrix} = 0.1354 \times \overset{\text{Character}}{\begin{bmatrix} 0.5820 \\ 0.3667 \\ 0.0513 \end{bmatrix}} + 0.5401 \times \overset{\text{Land condition}}{\begin{bmatrix} 0.3667 \\ 0.5820 \\ 0.0513 \end{bmatrix}} + 0.1295 \times \overset{\text{House availability}}{\begin{bmatrix} 0.7306 \\ 0.1884 \\ 0.0810 \end{bmatrix}}$$

$$+ 0.0740 \times \overset{\text{Financial position}}{\begin{bmatrix} 0.7306 \\ 0.1884 \\ 0.0810 \end{bmatrix}} + 0.1210 \times \overset{\text{Reference}}{\begin{bmatrix} 0.4737 \\ 0.4737 \\ 0.0526 \end{bmatrix}} = \overset{\text{Overall}}{\begin{bmatrix} 0.4828 \\ 0.4597 \\ 0.0575 \end{bmatrix}}.$$

Source: Author Survey August 2015

Chapter 4 Consultancy Modeling of Linear Programing

4.1 Background

Being a developing country, the role of Khyber Pakhtunkhwa province agriculture sector in the socio-economic structure of Pakistan is playing essential role. As an agrarian economy majority of the population are still living in the rural areas and most of them are involve in the agriculture farm production by producing different food and cash crops, like (Wheat, Maize, Tobacco and Sugarcane etc) follow a traditional way of cropping pattern. However, the high increase in the population from last decades, the demand for utilization of limited land natural resources are increasing.

Therefore, the efficient increase in farm production is the higher concern, which still not exist in the country as whole and particularly in the study area. Due to the high availability of human labor force in agriculture market of the study area and undeveloped industrial sector, the adaptation of latest agriculture mechanization technologies make it difficult to implement for the improvement of farm production efficiency. However, the efficiency will be achieved by facilitating each decision maker (farmer) through adequate training and proper knowledge about cropping pattern and yield production.

Irfan Ullah (2015) pointed out, beside the technological improvement, the high skill labor is also a major prerequisite for the optimal utilization of the available resources. However, for the achievement of crop production efficiency the role of land tenure arrangements cannot be ignored in the landlord tenant relationship (Khan et al 2016). The important assumption of this research work, to develop a farm planning model for each decision maker (farmer) by applying linear programming program approaches.

4.2 An Overview about Linear Programming

Linear programming is a mathematical approach connected with the allocation of restricted resources. Therefore, the procedure is to optimize the objectives subject to the constraint either by maximization or minimization. However, Bender et al (1990) explained, that linear programming is a powerful optimization technique for modeling complex system. In the agriculture production the objective is to define and set up the decision making problem of a farm manager (farmer) as a LP problem in the available resources.

The management skills of the decision maker, which include qualitative as well as quantitative abilities, are the key attributes of the basis for one's decision and in quantitative techniques like LP have become the powerful tools which are often used to improve managerial decision making (Harry and Kent 2011). Therefore, the LP

model allow the decision maker (farmer) to make optimal use of restricted available resources such as (land, family labor, wealth etc.).

4.3 The General form of Linear Programming

$$Max\ or\ Min: Z = c_1x_1 + c_2x_2 + ... + c_nx_n \qquad (0)$$

$$s.t.:$$

$$a_{11}x_1 + a_{12}x_2 + ... + a_{1n}x_n \ \{\leq, =, \geq\}\ b_1 \qquad (1)$$

$$a_{21}x_1 + a_{22}x_2 + ... + a_{2n}x_n \ \{\leq, =, \geq\}\ b_2 \qquad (2)$$

$$\vdots \quad \vdots \quad \vdots \quad \vdots \quad \vdots \qquad \vdots \qquad \vdots$$

$$a_{m1}x_1 + a_{m2}x_2 + ... + a_{mn}x_n \ \{\leq, =, \geq\}\ b_m \qquad (m)$$

$$x_1, \qquad x_2, \ ... \qquad x_n \quad \geq 0 \qquad (m+1)$$

Source: Harry and Kent 2011, "Mathematical programming for Agriculture and resource economics".

4.4 The "XLP"

To accomplish above objective, we used the tool of "XLP" is a computer program running on Excel in Microsoft Windows to compute the optimal solution of a LP. XLP can provide an optimal solution for a LP model. It can solve a goal programming (GP) model, which can incorporate multiple objectives such as average income and reduced working time. It can also solve integer programming (IP) models, which can incorporate productive elements counted by discrete units, such as domestic animals, green houses, or fixed costs.

The LP model is entered on an Excel sheet "tableau" in a particular format, an additional XLP menu bar of computational options is added to the Excel menu bar at startup. The optimal solution is shown on worksheet as a "computed result". XLP can be downloaded from the following URL: http://39you.net/xlp/.

4.5 The objective of this study

The objective of this article is to present analysis technique by linear programming that can be combined into farm management linear programing model, to examine the economic effect of the four major crops grower as well as their production and income. Also will be checked out the efficient decision making behavior of share and fixed rent contract farmers.

Chapter 5 Observation and simulation

5.1 Background

First the case envisaged by Marshall. According to him, the output sharing discourages work efforts, and the resulting suboptimum is widely known as the Marshallian inefficiency. There is the conflict of interest between the contracting parties so long as the agents work efforts contributes to increased output and the landlords income positively depends on output, because landlords wants the tenant work harder, where work efforts generates disutility to him. Among tenancy contracts, share tenancy is more common than fixed rent tenancy in Asia. Because share tenancy has risk sharing benefits even though resource allocation under share contract is less efficient than under a fixed-rent contract?

According to Cheung (1969) if the work efforts of the tenant is directly observed and contractually enforceable, then the equivalent results can be obtained by any contract. If the contract is enforceable, the resource allocation and the incomes of tiller and landlords are equivalent under the fixed-rent, share and fixed-wage contracts in equilibrium. This contrasts with the Marshallian argument that the share contract yields an under-supply of the tiller efforts per unit of land and a lower income for the landlord compared with the fixed-rent contract. Therefore, the choice of a share contract involves some sacrifices of work incentives for the sake of risk sharing (Stiglitz 1974). Resource allocation is more efficient in owner-cultivation than share tenanted land because there is no incentive problem in the contract.

However, because of the disincentive effect of output sharing on work effort, expected output per unit of land tends to be lower under the share contract than under the fixed-rent and owner-cultivation. The equal sharing rule is not optimum for the landlords, unless the tenant work effort is also enforceable. Therefore, first-best efficiency is not restored by the rule of equal output and input-cost sharing if work effort is unenforceable. Source (Otsuka et al 1992).

Conclusion

The conclusion of this study is mainly based on the three discourses in order to understand the sustainable relationship between landlords and tenants about contractual choices. Therefore, we divided the dissertation into three main parts, which are discussed below.

Research 1: This study was based on the baseline survey which was conducted in Feb, 2014 and was checked out the features of land tenancy contracts between the landlords and tenants in study area, Swabi in Khyber Pakhtunkhwa of Pakistan. Especially the multiple tenancy contract and the long-term duration were much surprising in the study area because from the literature most of the empirical studies were worked on short-term tenancy contracts, which means one crop season, and relationship between single landlord and tenants or labor contracts. In the next step, in depth interview to some of the respondents in this study from the study area should be made on the basis of long-term duration and types of the contract, and the reasons why the landlord and the tenant proceed for the long-term contracts can be clarified. And to finalize the model on decision making and estimation based on the crop selection with their dynamics in each type of tenancy contracts may be very important in the decision support to the tenant when they are facing on the arrangement to cultivate and to select the suitable crops.

Research 2: Most of land tenancy literature discussed the landlord tenant relationship and their decision-making behavior in farm production area. This study uses AHP to identify the important attributes in land tenancy contracts that the landlords and tenants are demanding before signing the contract. The AHP application presented, provides informatics results of each relative factors in tenancy contracts and clarity of the finding of each respondent judgments in different villages of the targeted area. Thus, the dominant factors for landlords that influence the land tenancy choices shows that character, men power, experience in share contract and distance, financial position of the tenant's household in fixed contract were most influential factors for signing the agreement. On the opposite side the significant factors for tenants' choices in land tenancy shows that house availability, financial position, character in share contract and land condition, reference in fixed contract of the landlord's household are main important factors. In addition, all the important factors and their weights being found by AHP tool for new contract were ensure a secure tenure between the contracting parties. Also, the factor character, reference, experience and distance has played key role in the reduction of transaction cost phenomena for the contracting parties in the land tenancy contracts in study area. The quantification of the impacting factors of the land tenancy contracts is an important piece of information that will contribute to the landlord's tenant's decision making in agriculture production and development in general and particularly in the region.

Research 3: This study has examined and developed the farm planning models for share and fixed- rent tenants. Also the land, labor productivity and profitability comparison of share and fixed contract tenants were made. First, the models suggested and aggregated the labor hour coefficient on the basis of selected crops per acre operations. Second, profit coefficients, such as gross revenue and variable cost, was totaled in acres on the basis of their contractual parameter. The XLP arrangements presented provide of informatics results on the alternative models and shows their efficiency through optimal solution. The calculated results of land tenancy contracts, namely the comparison of share and fixed-rent farm, were organized. The high cultivated optimal acreages of fixed contract model showed that the tenant perform all the farm task, such as planting, harvesting, post-harvest and so on, persistently and timely. The results also imply significant profitability of fixed tenant model in the land constraint by shadow prices, if one more acre should be added in the contract. The results also indicate that payment of rent/ acre to landlord, give them full decision-making power, due to which first best resource allocation and high income from the contract was achieved. Thus, the fixed-tenant was more profitable because by taking all the production risk and his own financial interest. On the other hand, the share tenant optimal results showed that his cultivated crop acreages was low because of his inefficient working efforts and contract sharing parameter, means that the output share make the tenant work efforts inefficient. In land productivity comparison, the fixed-rent farmers were productive in maize and tobacco crops while the share formers were productive in sugarcane and wheat crops. In case of labor productivity, the fixed-rent farmers were productive in sugarcane, wheat and maize crops while the share tenants only labor productive in tobacco crop. However, in total land and labor profitability the fixed-rent contract tenants were more profitable than share tenants. Therefore, the results imply that share tenants was not perform farm tasks persistently, due to which the first best resource allocation and high profit from the contract were not realized as compared with the fixed contract. These results are true related to the land tenancy literature. (According to the theory of Marshallian inefficiency). Therefore, the land tenancy models estimation and comparison of this work refer to the farm management and sustainable agriculture development in the region that do not yet exit. This study recommends that the agriculture and extension services departments of Khyber Pakhtunkhwa province to apply XLP as a tool in the wide range of farm planning decision support system.

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